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No. 4
VOL. XXVII

75 E. Wacker Drive
Chicago, U. S. A.

ONLY two products in 1915 . . . Today a full line of biologics and pharmaceutics . . . Now being used by more than half of the practicing veterinarians of the United States

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D. M. Campbell, Editor **A. T. Kinsley, Associate Editor**

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Diphtheria is twice as prevalent; typhoid fever three times as prevalent, and small pox seven times as prevalent in the small towns and rural districts as in the 93 largest cities.

An enzyme found in the liver transforms the yellow coloring matter of carrots (carotene) into Vitamine A. Olcott and McCann of the Iowa University demonstrated the action of his hepatic enzyme outside the animal body.—*Science.*

Thompson, a young English biochemist, has found that an extract of the parathyroid gland from cattle will restrict or prevent growth without endangering the health of the experimental animal. This extract may be of value in the control and treatment of cancer and giantism.—*Science* 74-1929.

The diagnosis of chronic mastitis is sometimes difficult. Various methods and tests are available but they are of only relative value. Cultural examination of milk sediment may reveal streptococci but it does not differentiate pathogenic from nonpathogenic types. Microscopic examination of smears of milk sediment is frequently of value. The thybromol test which is dependent on the alteration of the alkalinity of the milk is of value but according to Minett and collaborators (*Bio. Abstracts* 23805) the alkalinity in 40% of their cases was insufficient for diagnostic purposes.

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Variation in the condition and surroundings of the hogs are more frequently responsible for post vaccination difficulties than either the serum or virus.—*J. C. Glenn.*

The majority of ailments of sheep are not difficult to identify and they are practically all preventable at a small cost.—*D. F. Luckey.*

Many of the shipping disorders of swine can be reduced to a minimum by proper feeding and care of the hogs just prior to, during and for a few days after shipment. The most common ailments of shipped swine are flu, hemorrhagic septicemia and enteritis. These maladies rarely occur in the animals that are properly handled before, during and after shipment.—*H. P. Leffler.*

QUACKERY IS CRUELTY TO ANIMALS

Truth to tell, few of the veterinary surgeons are really altruists, but they at least have a basis of scientific knowledge to guide their actions and judgment, and do attempt to fit themselves for their life work by submitting to years of training. The well-filled coffers of the R. S. P. C. A. would indeed be turned to good account if they could effect such additions to the Cruelty to Animals Act as would make it an offense for unqualified persons to use drugs or surgical instruments upon the living body.

Would we submit our children or ourselves to the clumsy surgery or dispensing of a barber or ex-kennelman? If not, why in all fairness should we so expose our helpless animals?

It is pitiful to realize that the general public still believes it to be cheaper in the long run and just as effective to buy somebody's powders or pills, thus dosing their sick animals with unknown chemicals in unknown doses for entirely undiagnosed complaints. The public needs enlightening upon these matters, and when its lesson has been learned, then may we find it an easier matter to introduce legislation for the suppression of quackery.—Hamilton Kirk in *The Veterinary Record,* Vol. XI, No. 41.

From 1865 to 1890 over 15 million cattle were trailed out of Texas.

There is no accurate gauge or measure of a sire's inheritance other than by testing out his daughters and comparing their records with those of their dams. Until a bull's inheritance is proved, his usefulness is a guess, his contribution is a gamble, and his damage is a potential probability.—*Hoard's Dairyman.*

"Poisons are unorganized chemical substances or organized structures (pathogenic fungi, bacteria, protozoa) which when placed in or upon the human body, by chemical action, cause sickness or death, under certain conditions." Lewin (*Bio. Abst.* 23416). The above definition of a poison gives food for thought. The basis of action by the definition is apparently confined to the human. According to this same authority "every sickness has poisoning as a basis." Thus, the term poison is used in a very broad sense. Whether the acceptance of such a viewpoint will clarify the medical and toxicological nomenclature may be questioned.

SKIN LESIONS OF TUBERCULOSIS

A study of skin lesions occurring in cattle that had reacted to the tuberculin test was made recently at the Chicago stock yards with the following result:

		Per Cent
Number showing skin lesions	322	8.5
Of this number:		
Associated with other lesions	155	4.0
No other lesions present	167	4.5
Location of lesions:		
Hock or below	157	
Knee or below	131	
Shoulder region	21	
Hip and gluteal region	6	
Miscellaneous	7	

The lesions varied in size from one-fourth inch to four inches or more in diameter.

Number with lesions of one inch or less in diameter	191
Number with lesions of more than one inch in diameter	131

Narcolepsy is a disease or condition that affects the human and is characterized by muscular weakness or lack of control of the muscles and an irresistible desire to sleep. Recently Doyle and Daniel of the Mayo clinic have reported the successful treatment of this malady by the use of ephedrine, a vegetable drug introduced into this country by Chen, a Chinese physician. Are the fainting goats of Tennessee narcoleptics?

In the official history of the (British) medical service during the World War it is stated that 58.8% of wounds were caused by shells, 39% by bullets, 2.1% by bombs and 0.32% by bayonets. Both the percentages of deaths from disease and from wounds were lower than those recorded in the South African war. Especially notable was the prevention of the enteric group of fevers. In the South African war the annual number of admissions to hospital due to this group of diseases was 103.8 per 1,000 of the strength, and the deaths 14.45 per 1,000. In France the respective figures for 1915 were only 5.86 and 0.26, and by 1918 admissions due to enteric fevers had fallen to 0.2 and 0.01 per 1,000.—*The Veterinary Record.*

Participants in the "Better-Sires" campaign, sponsored by the U. S. Department of Agriculture, own nearly two million head of breeding stock, both male and female. All the males are purebred, but the females include purebred, crossbred, grade and scrub animals. It is noteworthy that for every purebred sire owned by the participants—including all kinds of livestock, except poultry—there are six purebred females, two crossbred females, nine grade females, and only 0.4 scrub females. The ratio of six purebred females to every purebred sire is convincing evidence that persons who begin to improve their livestock by introducing purebred male breeding animals soon acquire purebred females as well. In the case of poultry the ratio is still higher, being 14 purebred females for each purebred male. Seventeen thousand five hundred fifty-five livestock breeders are enrolled in the campaign.

Evolution is not a theory. It is a fact as firmly established as the rotundity of the earth. But the method of evolution is by no means established. As to that, there are many theories.

The use of organic and collodial iodine as a curative agent for Bang's disease was investigated by Bartlett of New Jersey in cooperation with the Browncone Laboratories. The experiment extended over a period of 18 months on a herd of 25 milk cows. Ten to 20cc of a 5% organic iodine was administered orally and 30cc of a 5% solution of colloidal iodine was injected intravenously, intradermally or intramuscularly. The results have led to the conclusion that generally infected cows are not cured. —*Exp. Sta. Rec.* 65.

WISCONSIN AND OHIO COMPLETE AREA TESTING FOR TUBERCULOSIS

Wisconsin and Ohio have tested all their cattle—beef and dairy—for tuberculosis, and are now listed as modified tuberculosis-free areas, along with North Carolina, Maine, Michigan, and Indiana. Wisconsin and Ohio each finished the testing of five remaining counties in December 1931. Because of their importance in cattle breeding and dairying, officials in charge of the work regard the Ohio and Wisconsin achievements as particularly significant. In the entire country 1,309 counties (and 60 towns in Vermont) are now free of the disease, according to the standards of accreditation. This is about 42.5% of all the counties.

In Wisconsin, the tuberculosis-eradication campaign has progressed without serious opposition at any time. In Ohio the Federal and state testers encountered some opposition but the courts sustained the authorities. Since inauguration of the work, Wisconsin has tested approximately 10,500,000 cattle and has discovered about 175,000 reactors. Ohio made about 4,000,000 tests which disclosed approximately 90,000 reactors.

A Great Quartet in the War on Tuberculosis

Laennec, Koch, Roentgen, von Pirquet,
By KENDALL EMERSON, M.D.

ADVANCE in human knowledge is not accidental. It results from the work of men capable of building higher on the foundation of established facts. Nowhere in science is this better shown than in the age old conflict which man has waged against his arch enemy tuberculosis. Among the army of builders who have contributed to our present day knowledge of this scourge, four names lead all the rest.

The first of these, Laennec, a hundred years ago, recognized that more accurate knowledge of the disease must precede any hope of its control. The old method of searching for tell-tale sounds in the lungs by pressing the ear to the chest was not enough. One day he saw a boy scratching one end of a log while a companion listened to the sounds transmitted at the other. He applied the law of conductivity of sound to the diagnosis of tuberculosis of the lungs and our modern stethoscope is the result.

Just fifty years ago, March 24, 1882, Robert Koch announced that he had discovered a germ always present in active tuberculosis disease and had produced tuberculosis by injecting it into animals. He named his new discovery the tubercle bacillus. Laennec, through the perfecting of diagnosis, Koch through the discovery of the cause, made their respective and momentous contributions toward the conquest of tuberculosis. Both recognized, however, that some method of still earlier diagnosis was needed, for the disease is vastly more curable when detected in its very beginning before it is revealed by auscultation and before the tubercle bacilli can be found in the sputum from infected lungs.

It was reserved for Roentgen to disclose the next great step in early diagnosis. A distinguished physicist, Roentgen was experimenting with the tubes invented by Dr. Crookes for the purpose of passing an electric discharge through a vacuum. Roentgen made the startling discovery that reflected from the negative pole were some mysterious rays, capable of passing through solid substances impenetrable to light. He photographed the human body and revealed the bones and organs of a living man. With improved technique, the X-ray is now used as our surest method of discovering the spots and shadows in an infected lung which prove the presence of active or quiescent tuberculous disease.

The fourth great scientist, von Pirquet, added the last significant refinement in diagnostic procedure, the skin test which has been given his name. This discovery was based on the previously known fact that people suffering even mildly from certain diseases, or who have previously suffered from them, develop changes in their bodies which make them sensitive, as we say, to that particular disease. By the use of tuberculin, a harmless liquid secured from cultures of tubercle bacilli, von Pirquet made skin tests on individuals suspected of having tuberculosis in its early stages. If the skin grew red on the second day, he called the test positive since it indicated that the patient had been infected at some time with tuberculosis.

Laennec, Koch, Roetgen, von Pirquet, these are the immortals whose glory lies in their successive contributions to the warfare against an enemy which has claimed more human victims than all the wars of history. Each built anew on the firm foundations laid by his predecessors, and the structure they have reared is the monument to their undying fame.

The priceless contribution each made to medical science has been largely responsible for the phenomenal drop in the tuberculosis

death rate. Today, in the United States the death rate from the disease is less than half what it was in 1907. Efforts to reduce the rate still lower continue. Beginning April 1, tuberculosis associations throughout the country will undertake an Early Diagnosis Campaign under the slogan "Find the Other Case." During that time closer cooperation in discovering cases of tuberculosis will be sought among doctors, health officers, public health nurses, and social workers, and everyone who suspects he may have tuberculosis will be urged to have a medical examination to make sure. If anyone finds he has the disease, he will be urged to secure medical examination for other members of his family to discover the source of the infection, for only by "Finding the Other Case" can tuberculosis be overcome and its spread stopped.

BOVINE TUBERCULOSIS NOW RARE IN ILLINOIS

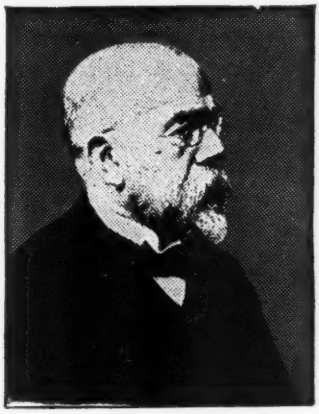
Tuberculosis in cattle was once a great source of danger to people in Illinois. This danger has been reduced almost to the vanishing point. People are protected from bovine tuberculosis in two ways. One is the pasteurization of milk and the other is the elimination of tuberculosis among herds through the testing of cattle and the slaughter of those which are infected. Both of these methods have been employed on a large scale in Illinois.

The result is that more than 3,000 cases of tuberculosis of bovine origin are prevented annually in the State. This at least appears to be a fact from the statistical evidence available. Bovine tuberculosis in humans is confined largely to children under 5 years old.

Twenty-five years ago, 6 per cent of all deaths from tuberculosis in Illinois were among children in that age group. In 1930 only a trifle over 3 per cent were among children under five. The actual number of deaths from tuberculosis among children under five years old has declined from about 450 to about 150 per year within a quarter of a century. Most of this decline has occurred during the last decade.

This indicates about 300 fewer deaths per year in a population much bigger than that of 25 years ago. Since for each death there remains 9 or 10 cases of the disease, the improvement includes the prevention of some 3,000 cases of childhood tuberculosis per year in Illinois.

A large percentage of bovine tuberculosis is confined to abdominal tuberculosis in children under five years old. Thus if control measures over bovine tuberculosis are effective there should be a significant decline in abdominal tuberculosis among these children. An examination of the statistics shows a very marked reduction. Twenty-five years ago abdominal tuberculosis accounted for 11 per cent of the mortality from this disease among children under five years old. Ten years ago it accounted for 6 per cent. In 1930 abdominal tuberculosis accounted for only 3 per cent of the mortality in this age group.



Robert Koch

Constant vigilance will be necessary to maintain herds free from tuberculosis. While pasteurization if properly performed will protect consumers from the danger of tuberculosis through the use of milk, it must be remembered that there are some 10,000 dealers in Illinois who handle raw or unpasteurized milk. Tuberculosis free herds is the only protection the customers of these dealers have against infection from cattle.—*Illinois Health Messenger.*

Laboratory Activities*

By GEO. W. STILES, JR., Denver, Colorado

FEW people realize the protection afforded our domestic animals through the activity of the Federal Bureau of Animal Industry. A large number of trained veterinarians and other scientists safeguard ports of entry against diseases existing in foreign countries, and also materially aid in the prevention, control and eradication of animal diseases throughout our nation.

Local laboratory activities of the Bureau are conducted under the general supervision of the Pathological Division located in Washington, D. C. Since the establishment of this laboratory in Denver some twelve years ago, more than fifteen thousand specimens of various kinds have been received for examination. These specimens were largely from the domestic animals of the western half of the United States.

This office was established to make diagnosis and study the nature and cause of the diseases incident to domestic animals on farms and ranges. As a result of these studies new agents for the prevention and cure of animal ailments are developed when possible. Aside from the investigation of the ordinary diseases of horses, cattle, sheep, swine and poultry, many other problems have arisen pertaining to the health and welfare of man and his animals. Medical investigators are now finding that many diseases afflicting the human race have their origin in the lower animals; therefore, a better understanding of these various maladies in such animals, enables the scientist to combat more successfully disease in the human race.

During recent years much time has been devoted to the comparatively new disease of anaplasmosis in cattle, a malady similar to tick fever of cattle in the south. The new cattle pest has gained a foothold in a dozen or more of our southern and western states. Experimentally it has been transmitted from sick to healthy animals by ticks or biting flies. Devising a method to control or eradicate this cattle plague is one of the major problems now confronting the government.

The annual losses in feeder lambs in the Rocky Mountain region amounts to upwards of one million dollars. This problem is a major project awaiting solution. Other diseases of sheep are also receiving attention.

Anthrax in cattle exists in this section of the country; hence the accurate diagnosis of this malady enables the veterinarian to combat this disease successfully, one which attacks man as it does lower animals. During the past season many positive cases of this disease have been diagnosed in this laboratory. The germ of contagious abortion in cattle and swine may cause illness in human beings. Through certain laboratory tests the presence of this disease may be detected, thus protecting man and his livestock from serious disorders. A number of such cases are on record in this laboratory.

Rabies in dogs and other animals constitutes a serious public health problem. The diagnosis of this much dreaded disease is accomplished by microscopic examination and animal inoculation. Considerable attention is being given this subject.

Botulism, or food poisoning in man, or his livestock, is caused by the ingestion of a deadly toxin, produced by certain soil germs, grown under favorable conditions. A definite diagnosis of botulism has been confirmed in this laboratory many times.

Farm water supplies used for household purposes are often polluted and dangerous. Bacteriological examination of water samples, properly collected, will disclose the quality of the product and its suitability for human consumption. This office makes such examination.

Diseases of poultry require much attention. Cholera, roup, bronchitis, fowl typhoid, coccidiosis, blackhead in turkeys,

*Radio talk, KLZ, November 19, 1931.

tuberculosis, bacillary white diarrhea, feeding problems, improper care and handling are items connected with the poultry industry. The success or failure of poultry raisers may depend on one or more of the above factors. Our laboratory attempts to diagnose these ailments, and assist the owner or veterinarian so far as possible.

Various diseases affecting domestic rabbits, guinea pigs, and other small animals are items in which we are interested.

The speaker recommends the acquaintance of your local veterinarian. He can furnish valuable assistance. If in doubt, he probably will send specimens to the nearest laboratory. Hence, cooperation of the livestock owner with his local practitioner is vital. When the safeguards mentioned are used, losses of valuable animals on the farm should be reduced to the minimum.

ANTHRAX IN SWINE*

Three types of anthrax occur in swine: the cervical (pharyngeal), the intestinal and the septicemia types.

The pharyngeal type, which is the most prevalent, shows on autopsy the connective and muscular tissues to be infiltrated with a serous exudate, which may be translucent, yellowish or reddish in color; lymphatic glands increased in size from a few diameters to those cases showing glands the size of an orange. The color of these glands vary from a pronounced hemorrhage into the gland to a yellowish or grayish appearance. If the disease is not too acute and the animal does not die from suffocation, these glands will show necrotic foci in the center and also scattered through different areas. Edema of the glottis will be found in many of these cases. In some cases there is a cyanosis of the mucous membranes and bluish red spots develop on the skin covering the affected area.

The intestinal form of anthrax is characterized by high temperature, frothy and many times blood-stained diarrhea, marked depression and usually death within two or three days. On autopsy, the duodenum is most frequently affected. The entire intestinal wall may show sero-hemmorhagic inflammation with a tendency to disintegration. The intestinal lymphatic system is frequently involved. Areas of degeneration accompanied by necrosis will be found in the wall of the intestine, and they may vary greatly in color, being brownish red, brownish gray, brownish green or brownish yellow.

The septicemia type of porcine anthrax is characterized by sudden death and rapid decomposition of the carcass, as is so frequently seen in other species, especially horses and cattle. Slowness of the blood to coagulate, dark, almost black, appearance of the blood at times and changing of the color to definite red after exposure to the air, are of diagnostic value. Spleen changes in this form are quite characteristic, being swollen in some instances and many times normal size; dark in color and on incision the pulp will flow from the trabecular spaces. In these instances the spleen pulp is not so completely degenerated as in other species and does not permit the same to flow from one end of the spleen to the other.

In the sub-acute, septicemia type, the spleen will show enlargement, but not the characteristic softness; many times circumscribed areas varying in size, of firm hemorrhagic necrotic foci. These are dark brown or grey-red in color. The liver changes seem to run quite constant in this form of the disease, showing marked congestion, enlargement, dark, brownish-red in color and many times pronounced sub-capsular hemorrhages, giving the organ a hob nailed appearance.

Anthrax should be differentiated from malignant edema, affecting the cervical region, swine erysipelas, suipestifer gastro-enteritis, and coccidiosis.

*From a discussion by T. W. Mumce, Sioux City, Iowa, at the 44th annual meeting of the Iowa Veterinary Medical Association, Des Moines, January 12-14, 1932.

My Experience in Attempting to Control Infectious Enteritis in Pigs

THE information contained in this report is confined entirely to experience in handling pigs that have been used in hog cholera serum production. Some of these were treated in the pens of the establishment; others were treated after removal to the farm. There are two classes of such pigs, namely, pigs that were inoculated for virus production and did not sicken, and pigs that were used in testing serum. Since these pigs are of no further use in the serum plant and cannot profitably be kept there they are disposed of as feeders as soon as possible. It frequently happens, however, that they cannot be sold as soon as they should be, and it is well known among serum producers that such pigs kept in the pens of the establishment for any length of time do not thrive. One of the most common ailments to combat, in these animals, is infectious enteritis.

In the past various methods for controlling this condition have been used. The results often have been quite unsatisfactory and at times the losses have been excessive. During the past year we have followed a method of treatment and feeding which have reduced our losses very materially.

Pigs that were inoculated for virus production and failed to sicken were given a liberal dose of hog cholera serum and a dose of vaccine usually prepared from strains of *S. suipestifer* and *B. suisepticum* isolated from cases occurring in our pens. While a separate vaccine was not prepared for each animal, yet the product may be considered of an autogenous character. In a few instances the stock vaccine was used, but we believe better results were obtained with vaccine prepared especially for the purpose. This serum-vaccine treatment was given on the tenth or twelfth day after the virus inoculation. In the case of test pigs, they were treated as soon as released at the conclusion of the test period. Following the above double vaccination, if not disposed of, they were restricted to a diet consisting of the following:

Sodium Hydroxide Flakes, 12 lbs. 8 ozs.
Pot. Guaiacol Sulphonate, 13 lbs. 4.5 ozs.
Sodium Phosphate U. S. P., 6 lbs. 4 ozs.
Oil Anise, 3⅛ ozs.
Cerelose, 9 lbs. 6 ozs.
Caramel Sol. 50%, 1 lb. 9 ozs.
Water Dist. qs., 25 gals.

One to one and one-half pints of this solution were added to fifteen gallons of water. One pound of salt was also added. About three bushels of whole oats were soaked in the mixture for at least ten to twelve hours. It was fed in liberal quantities, placing the soaked oats and liquid in troughs so that as little as possible was lost. In pen feeding the pigs were fed morning and evening. It has been our practice to continue such feeding from 21 to 30 days, providing the pigs were not sold during the period. We have never experienced difficulty with pigs refusing to eat; on the contrary they take it as readily as corn or any other grain. In the case of the pigs fed on the farm where they had access to pastures, they were penned in the evening and given the soaked oats feed in the morning before being released for the day. It was noted that many intestinal parasites were expelled, especially ascarids. The pigs fed on the farm did not require as long a period of treatment as those kept in the pens.

During the time of this special treatment no other grains were fed and especially no tankage. In seven to ten days after the serum-vaccine treatment another dose of vaccine was given. It was noted that large doses of such whole culture vaccine gave better results than small doses. At least ten cubic centimeters of a rather heavy suspension were given at each injection. No clini-

*From a discussion by C. E. Salsbery, Kansas City, at the 44th annual meeting of the Iowa Veterinary Medical Association, Des Moines, Jan. 12-14, 1932.

cally noticeable reactions were ever observed.

At the end of the 21 to 30-day period in the case of the pen-fed pigs, they were turned on the self-feeders containing a balanced ration of ground feed. It was found that enteritis could be much more readily controlled among the pigs taken to the farm, and this is to be expected, since the range on good pastures affords much better conditions of sanitation than one can maintain in pens or dry lots. Consequently, the pigs treated on the farm did not require as long a period of special handling—usually from 10 to 15 days. The second injection of vaccine was given to these the same as in the penned pigs.

It is easier to prevent enteritis than to cure it. Our attempts to cure cases of the disease, we believe, have met with some success, but conclusions cannot be based upon the cases to be reported. Our method of treating cases of enteritis in the early stages are so contrary to the accepted principles of vaccine therapy that we make this report with due reservations until many more cases are treated. Our experience, however, covers a number of cases in which the diarrhea was pronounced, and the characteristic chocolate-colored fecal matter indicated severe inflammation of the intestine. Very often such cases are seen in otherwise apparently normal pigs, having good appetites and unimpaired vitality. We have not attempted to treat any but those in this condition. To pigs weighing approximately 100 pounds or even less we gave from 15 to 25cc of the whole culture vaccine prepared from native strains, chemically killed, without any ill effects from the size of the dose. Sometimes the dose was repeated as soon as 48 hours. At other times on the third or fourth day. Not more than two doses have ever been given to one pig. In some of the cases so treated we have observed almost immediate improvement, with ultimate, complete cessation of the diarrhea, followed by recovery. Caution was taken to remove all concentrated feed, tankage in particular, for at least a week. Light feeding with slops was given. We have not used buttermilk, but believe it may be beneficial. We are not attempting an explanation of the results, neither do we recommend it as a sure cure. We hope others may try it. We are continuing this treatment in other cases to confirm our opinion and results.

At any rate, we are satisfied that during the past year our losses from enteritis in these pigs have been materially reduced.

HOG-CHOLERA VIRUS NOT CONTAMINATED*

Virus for both hyper-immunizing and simultaneous vaccination of swine is selected from pigs purchased in outlying districts where little immunization has been done and where outbreaks of cholera are rare because of the scarcity of swine.

Such pigs are placed under observation for a perioid of three days and if they show no evidence of disease, they are then injected with known virulent virus. Pigs that sicken between the fifth and the eighth day are bled for virus. Such pigs evidence the usual symptoms of hog cholera consisting of inappetance, marked depression, gauntness, tendency to hide in the bedding, knuckling, sickness, matting of the eye lids and a range of temperature from 104 to 108 deg. F. The essential lesion found in virus pigs may be very limited in a small percentage of the pigs that are destroyed for virus purposes. Usually there is a hemorrhage of the capsule of the lymph glands, petechia in the kidney, bladder and lungs. There is little difficulty in differentiating the symptoms and lesions in cholera induced in virus pigs from such maladies as "flu," hemorrhagic septicemia, etc. Therefore, practically all the virus obtained is of high virulency and because of the added preservative, there is practically no danger of contamination of hog cholera virus with the organisms of any other malady.

*From a discussion by G. E. Whipple, Omaha, Neb., at the 44th annual meeting of the Iowa Veterinary Medical Association, Des Moines, January 12-14, 1932.

Calcium Gluconate in Veterinary Practice

By E. T. BAKER, Moscow, Idaho

CALCIUM gluconate is a neutral, organic salt, prepared from calcium and gluconic acid. It contains no sugar, and its value comes from the calcium ion. It is a white, lime-like powder, and may be either fine or somewhat granular.

Prof. J. Russell Greig, of the Royal (Dick) Veterinary College, Edinburgh, gives a very helpful article in the Veterinary Record, February 8, 1930. It was this article that brought our attention to the product, and the first we used was the original gluconate made by "Sandoz." Later on, we began using the sterile solutions prepared by veterinary supply houses in this country.

Its chemical formula is $(C_6H_{11}O_7)_2Ca.H_2O$. Of course, we realize nearly every practitioner has kept up on his chemistry just as we have, so the above formula is as clear as mud. If the manufacturing chemists let an ion or two get away from them, all we can suggest is that they put an ad in the lost and found column. By the time we collect enough money to pay for it, our main object in life has been accomplished.

It is important to remember it contains no sugar or glucose, and that to obtain the curative effects of these agents, particularly in eclampsia, they should be added in the treatment.

Calcium gluconate contains 13% lime. It is soluble in cold water (1 in 30). In boiling water the solubility is 1 in 4 to 5 parts. The ampule preparations as marketed contain a 10% supersaturated solution. However a 5% or 6% solution can be readily prepared extemporaneously and we think they may be absorbed more easily. If a sterile solution is used, and it is cloudy or full of precipitated particles, it should be opened up just before it is to be used, poured out in a small pan, several ounces of water added, and the mixture boiled vigorously for a couple of minutes. Allow to cool down to blood temperature. We wasted a number of bottles of sterile solutions before we found we could make it suitable for use. If the powder is used, about two ounces added to a quart of boiling water and boiled several minutes, and cooled before adding to your intravenous bottle, will be the average dose for a cow with parturient paresis.

When properly prepared and used, one can inject several thousand cubic centimeters in the tissues of the shoulder, and it will be absorbed within a few hours with no apparent local irritation. If irritation, swelling, or abscess formation occurs, something is radically wrong with the solution itself, the needle, or the method of injection. We have never had any untoward sequelae so far, but we have noted a slight swelling and lameness after using a large quantity of 10% solution. We have been told that this could probably have been avoided if we had massaged, carefully the sites of infection for a few minutes so as to partially disperse the fluid. Naturally large amounts of any fluid injected subcutaneously or intramuscularly cause a distention of the tissues which is liable to be somewhat painful. However we prefer more dilute solutions, and they should be crystal clear.

We use a regular intravenous outfit to inject it under the skin and into the loose connective tissues of the shoulder. We use a 1,000cc. bottle, and keep our needle in an oiled cork, so that it does not rust or get plugged up. If any part of the outfit suffers from a stricture or calculus, the cork of the bottle is apt to blow off and the solution is sprayed over the operator. This is a very pleasant occurrence when one is ten miles from home at four a. m., and with only one bottle of the

solution. We find that if we hold up the bulb as we inject, and hold the cork of the bottle between the fingers of our left hand, and keep our needle and tubing perfectly clear, we can inject 1,000cc. in a very short time. If injected into the vein, we prefer to point the needle toward the heart, instead of toward the head. In ewes we use a 20cc. hypodermic syringe and inject into the axillary space. In sows, we use the same location, or, if the animal is peevish, inject back of the ears. In dogs, either the back of the neck or loose tissues of the hind legs may be used. In horses, we prefer the intravenous route. For small animals the sterile 10cc. ampules or 50cc. bottles are the handiest.

The Uses of Calcium Gluconate

The new calcium therapy in milk fever has opened up a wide field. We are not going into a discussion of the merits or disadvantages of calcium gluconate or calcium chloride, for this is a question, like prohibition, for each taxpayer to arrive at his own conclusion. We will not go into the subject of milk fever, because that has been discussed in this moral and professional guide last month.

Bloody Milk

Last summer we were treating a case of an obstinate bloody milker. We treated

SNOW CAR-HIGH IN IDAHO

While the Middle West and the East were experiencing balmy breezes during the past winter, with the temperature fifty or above, the Northwest was experiencing an "Old Fashioned Winter." These photographs were taken with Doctor Baker's graflex during February. At that time, the temperature was four degrees above zero, the snow six feet deep on the level and there had been 110 inches of snow fall since November. Such conditions make obstetric work in the open interesting.

her with iron sulphate, sodium hyposulphite, and a host of other internal remedies with no success. One morning we happened to have a case of milk fever at this place, so we just thought we would give 500cc. of a 6% solution to this cow. In three days the owner said he noted a disappearance of blood in the milk, and from then on she was apparently normal. Since then we have used this treatment in a number of other cases of bloody milk with very good success.

Posterior Paralysis in a Dog

The next experiment was that on a small dog, a fox terrier, who had fallen out of an auto and injured his back so

Fig. 1. Paralyzed dog when treatment was commenced.

that he could not use his hind legs. He reminded one of an old chorea case. We gave the little fellow 10cc. of a 10% solution once a week, and had the owner give a grain tablet of calcidin once daily in raw liver or bone marrow, and add a little corn syrup to the milk. In three weeks the animal was able to walk.

Injury in a Cow

Our next case was that of a Holstein cow that had been hit on the left hip by an auto and bumped into a ditch, landing on her right shoulder. We could find no fractures or dislocations, but she remained unable to rise after using several gallons of liniment and internal treatment. We then gave her 500cc. of a 6% solution of calcium gluconate, and the next day she was standing up, chewing her cud, and from then on, made a rapid recovery.

Pregnancy Disease in Ewes

We have used it on several hundred cases of pregnancy disease in ewes, and even small doses effect a wonderful change for the better. If the animal shows eclamptic symptoms, such as grinding the teeth or muscular tremors, add dextro-glucose. One can use 10cc. to 50cc. at a dose, the main thing being to supply the needed amount. Half enough will result in a temporary rally, but the animal will die getting well.

Calcium Deficiency

We might say we use this wherever we think there is a calcium deficiency. We do not think calcium gluconate will raise the dead, cure fallen arches, relieve financial constipation, or repair fractured bones, but we do believe it to be a won-

Fig. 2. Dog shown in Fig. 1 one week after treatment was begun.

derful aid in every day practice. All we really do is to assist Nature, and when we supply her with the proper elements, we get credit for a "wonderful cure."

The future will reveal many uses for this valuable therapeutic agent, for, when properly prepared, and correctly used on appropriate cases, particularly in paralytic types, with or without dextro-glucose, the results will be very pleasing.

Bowling Over the Statute of Limitations

By FRED E. KUNKEL, LL.B., Washington, D. C.

ONE trouble with most veterinarians in the collection of their accounts is that they let them run too long, forgetting there is such a thing as a statute of limitations until it is too late. Yet if there is danger of losing an account because it may become barred by the statute of limitations, letters may be written or statements may be mailed and framed in such a way that the debtor can be made to acknowledge his indebtedness, or to make a promise to pay in writing, which is sufficient to start the statute of limitations running all over again, or at least to postpone the outlaw date.

Every debt owing to the veterinarian that is two years old is likely to run amuck of the statute of limitations, for which the period varies in various states. Naturally every veterinarian should be familiar with the law of his own state and he should also know the various ways in which he can keep desperate accounts alive, i.e., how to keep those stale accounts from becoming outlawed by the tolling of the statute of limitations.

There are a number of ways in which the statute of limitations can be stopped from barring the collection of accounts, viz:

1 Part payment;
2 Written promises signed by the debtor;
3 Giving a note;
4 Oral statements with witnesses present;
5 Payment other than in money, such as in merchandise or in service.

Even a small partial payment is enough. If no payment is made on account, however, every effort should be made to secure a promise to pay *in writing*. It is to be remembered that the payment of only $1 is sufficient to stop the statute from running or that a letter signed by the debtor promising to make payment is sufficient. If the payment of one dollar can not be secured, the debtor may be willing to sign a note. Even though he doesn't intend to pay the note, it has the effect of renewing the debt and starting the statute to running all over again. So, also, if the debtor is a storekeeper and allows you to take merchandise in payment of your debt, and says that this will go on payment of his accounts, that is enough.

It is sometimes also enough if a conditional promise has been made to pay a debt provided it is accompanied by a sufficient showing that the condition upon which the promise is made to depend has been performed, such as when the debtor expects an inheritance, or expects to get some money in from some one who owes him.

Part payment is regarded in most jurisdictions as the best of all acknowledgments. A part payment must, of course, be voluntary. The principle is that by a part payment the party intended to acknowledge and admit the greater debt to be due and upon which the inference may be drawn of a promise to pay the balance, and so the payment alone revives the debt no matter how old it may be. The part payment also marks the time from which the statute of limitations begins to run anew. The effect is to continue the old obligation. It makes no difference whether such a payment is made before or after the debt is barred.

It is not always necessary that the payment be in money—anything of value may be given by the debtor and accepted in payment, and will be sufficient provided it is accepted as part payment only and not in full payment.

Offers of compromise should not be relied on to take the case out of the statute of limitations because they do not "toll" the statute, nor should an offer of settlement be considered as enough because this may be made merely with a view to avoiding trouble or litigation. It will not renew a debt which is barred by law. The debtor should be induced to sign a promise to pay.

A payment of part of a debt in full satis-

faction of the whole, or a payment made by the debtor under the impression that he is paying in full does not revive the statute.

Where a debtor upon being shown his statement of account says that he is willing to settle it and to pay at some date in the near future, it is enough to stop the statute from running, but where a debtor simply promises to settle up and his words indicate that he looks merely to a future adjustment of accounts between the parties, it is not enough. Where, however, the debtor promises to settle up by such and such a date it is equivalent to agreeing to pay the account. A promise should, therefore, be exacted to settle on account on or before a certain date.

Sometimes a written promise "to fix it up all right," may be sufficiently strong and definite enough to stop the statute from running. However, it is always well to play safe and to so word a letter demanding payment, or to so rubber stamp a statement of account, that the debtor is bound to reply and admit his indebtedness as justly due and owing.

The giving of a note for a debt or for a part thereof, or even for the interest is sufficient to stop the statute from running, as in a renewal note. Even an agreement to pay interest on a debt may be construed as an acknowledgment of the debt from which a promise to pay may be implied.

A mere declaration of inability to pay is not, however, sufficient in itself to remove the bar unless it is coupled with expressions which denote a willingness or intention to pay. A promise to pay "as soon as I can," "as soon as possible," or "if I can," "when I am able," "when conditions are better," or "when it is more convenient," in general are not enough to take the case out of the statute of limitations since they are generally regarded as being too indefinite.

If the debtor can be made to say "I will use this money which I owe you for another year," it is enough to start the statute running again. So that, if you write a debtor a letter and say "Do you wish to keep the money yet, or will you pay me now?" and the debtor replies that he wishes to keep the money as he can make good use of it, that is also enough.

In general, it is well to remember that it is not good policy to try to secure an acknowledgment or a promise to pay, or a part payment on Sunday.

A promise to pay over the telephone where the transaction is between the debtor and the veterinarian alone is not enough. It is something that cannot be proved in a court of law in the absence of corroborating witnesses and, therefore, if you wish to hold the debtor liable you should have two telephones in the office so that some one can listen in with you on the conversation and prove what the debtor said.

Care should be exercised not to accept a promise to pay of an attorney who represents the debtor unless you see the debtor's authority in writing, because an attorney cannot bind his client unless there is evidence of a general authority or of a special authority to make such a promise because of the well known principle of law that an agent cannot bind his principal.

Where there are several joint debtors, the statute is not revived, nor is the running of the statute suspended, by the promise of one of several joint debtors, for such promise can not be used against the others.

If the debtor dies it is well not to consider the account as lost because there may be a provision in his will that all *just debts* be paid, which is construed as sufficient in most states to prevent the bar of the statute.

If you are dealing with a debtor who is familiar with the statute of limitations you should be careful about a verbal promise made by him not to plead the statute in case a debt becomes outlawed, because this is not sufficient either as a new promise, or as an acknowledgment of indebtedness. You should get the debtor to put it in writing; otherwise, it has no value.

If a person leaves the jurisdiction and goes out of the state, his absence or non-residence stops the statute from running. So, also, if the debtor is concealed within the state and cannot be found, that also suspends the statute from running during such period.

Most veterinarians are not inclined to sue a debtor before the statute of limitations has

expired when they think he is not worth a judgment, and they do not want to incur the additional cost and expense. But later the debtor may make money. He may even get rich, or he may fall heir to money, and then it is too late. The best rule to follow, therefore, if you cannot get a part payment, a note, or a promise to pay in writing, is to reduce your claim to a judgment, for then there are more chances to collect it over a longer period of time, and you always have the whip-hand over the debtor.

If, however, the statute has run, or is liable to run, and suit has not been filed, every effort should be made to get a dollar payment, or a promissory note, or a letter from the debtor promising to pay the account, because every promise to pay a debt which is barred by the statute of limitations must be in writing and signed by the debtor. If you can get the debtor, therefore, to write you a letter promising payment, that is enough.

Where a debtor is willing to sign a typewritten statement below an account, which is presented to him for payment, viz: "The above statement is correct and I owe the balance as shown due above," that is enough of a promise in writing to take the case out of the statute of limitations, because in subscribing to the acknowledgment of the correctness of the account and by stating the amount due, the debtor's acknowledgment constitutes a new promise sufficient to remove the bar of the statute.

So, also, a letter written to the debtor asking him for payment on account, stating the amount and asking him to return the letter with a check-mark opposite any one of the following is sufficient, if he signs it, viz.:

1. I enclose $1 on account, and I expect to pay the balance, or at least a part thereof on or before ——— 1933.
2. I acknowledge the above debt as justly due, but regret that I am unable to pay it at this time. I hope, however, to make payment on or before ——— 1933.
3. The above statement is correct and I owe the amount shown but am unable to pay at this time. I will try to make some payment on or before ——— 1933.

(Signed)

A GENERAL-PURPOSE OINTMENT

An ointment that can be used almost every day in practice, without a strong, creolin or pine-tar odor is composed of the following:

Adeps	lb.	10
Petrolatum	lb.	5
Cera Flava	oz.	4
Pix liquida	oz.	16
Phenol	oz.	4
Liq. cresolis com.	oz.	8
Ol. cajuput	oz.	2
Ol. sassafras	oz.	2
Kerosene	oz.	8
Sulphur sublimatum	lb.	2

Melt the adeps, petrolatum and cera flava in different containers, and mix well in a large dishpan.

Have the liquid ingredients warm. First add the pix liquida, stirring well. Then add the other liquid ingredients and keep on stirring.

Last, add the sulphur, which has been sifted, and give about fifteen cents' worth more stirring.

As it cools, stir frequently, and you will have a smooth, tan-colored, neutral smelling ointment that keeps your clients guessing what is in it.

We use it for itch, footrot, wire cuts, abscesses, skin troubles and the like in horses, cattle, sheep and hogs. We do not use it in dogs or cats.

It relieves irritation; repels flies; freshens up old sores, and is useful for summer itch in horses. It works so well that it discourages home made mixtures of creolin, sulphur and "fryings."

We keep our ointment in ten pound lard pails, and this will be found to hold up in the hottest weather. Straight adeps has a tendency to "run" in warm water, and the other ingredients seem to hold this in check.

We make up other ointments, and purchase a good many from the supply houses, but this is our mainstay for everyday work.

When we get through making this up, we apply our improved white liniment to our hands, which acts as a solvent and cleaner, and we are again ready for a four-hand pinochle game or a bowling match.

Moscow, Idaho. E. T. Baker.

Fowl Pox Vaccination and Suggestions for Handling Roup*

IT SHOULD be thoroughly understood that fowl pox has nothing to do with roup and that immunity to pox confers no immunity to roup. Birds are not very much affected by external pox but internal and generalized pox is serious.

Roup is the disease most commonly confused with pox. Roup is an infectious rhinitis. When this is light, people call it a cold. When it is severe, they call it roup. Roup is seldom seen in the eye though swelling of the facial sinuses may close the eye by pushing the lower eyelid upward.

Pox, on the other hand, commonly affects the eye in which canker ultimately forms. This canker adheres to the eyeball and may destroy it. In the early stages of pox cankers may be removed from the eyes easily. Later little is gained by removing them as the affected eye will then be found to be permanently injured.

In vaccinating mature birds for the prevention of fowl pox, one should use a pigeon pox virus. Fowl pox virus is effective as a vaccine but contains an element of danger in that it sometimes produces the disease instead of only the immunizing reaction. The pigeon pox virus on the other hand does not cause the disease in chickens. Unfortunately the immunity produced by the pigeon pox virus is not so solid as that produced by the chicken pox virus and can not be depended on to protect for more than about three months.

As in the vaccination of swine for the prevention of hog cholera, the vaccination of chickens for the prevention of fowl pox sometimes causes a latent infection to flare up. This causes plenty of trouble and is likely to get the veterinarian cussed out roundly. It will usually take an autopsy in such cases to determine what the trouble is and place the blame where it belongs. Frequently it is due to coccidiosis or parasites.

The pigeon pox virus is less likely to be followed by post-vaccination troubles than is the fowl pox virus. One of the pitfalls in vaccination of chickens for the prevention of pox is the production of generalized pox. The vaccination must be done so as to produce a local skin lesion. It may be done by plucking a few feathers and rubbing the virus into the follicles with a swab, or perhaps better still by the stab method, which consists in wrapping adhesive tape around a scalpel to leave only from one-eighth to one-sixteenth of an inch of the point protruding, and then after dipping the scalpel into the virus puncturing the skin with it. A pair of sharp pointed scissors works equally well. For the production of a solid and lasting immunity vaccinate with fowl pox vaccine when the birds are six to ten weeks old. On mature and laying stock use pigeon pox vaccine

Prevention and Treatment of Roup

The poultrymen of Michigan are frequently solicited by representatives of the commercial houses who claim to have a combined vaccine for pox and roup. Others have a vaccine for pullorum disease and other ailments of chickens. Our advice to the poultryman is not to fall for the claims of the traveling salesman, but to employ a local man or a state man who can be checked up, someone to whom they can pin responsibility and whom they can find afterwards if trouble developes in their flock.

It is no simple matter to handle roup. It is easier to control pox. Good bacterins sometimes do reasonably well in controlling uncomplicated roup, but heavily parasitized birds do not respond well to any immunization. I recommend, in the use of bacterins for the prevention and treatment of roup, to use two injections always, and better still, three injections.

I believe it to be a mistake to use "shot

*Notes from an address by H. J. Stafseth, East Lansing, Mich., at the Eighth Annual Post Graduate Short Course for Veterinarians, Michigan State College, East Lansing, January 26-30, 1931.

gun" bacterins. The organism most likely responds best to one antigen at a time. I think a roup bacterin should contain at least 80% staphylococcus aureus, with a few streptococci and if fowl cholera is common in the locality, that organism also may be included. If it is desired to immunize for fowl typhoid also, it should be done with a separate bacterin and at a different time.

Black Head in Turkeys

The turkey industry in Michigan is growing and veterinarians are soon going to be called upon for help in the control of diseases of this bird. Blackhead is the greatest curse of the turkey industry. It is one of the simplest diseases to diagnose.

The common diseases of barnyard fowl in this state are: (1) Blackhead; (2) pullorum disease; (3) fowl typhoid; (4) fowl cholera; (5) worms (round and tape); (6) coccidiosis; (7) tuberculosis; (8) leucemia; (9) roup; (10) pox and (11) sarcomatosis.

Goose septicemia (cholera) is the commonest disease of domestic water fowl in this state.

WASTAGE IN DAIRY HERDS IN SCOTLAND

Following investigation carried out in Scotland by the Hannah Dairy Research Institute, some interesting figures relating to the incidence of disease in dairy herds have been published. It is reckoned that disease disposals constitute 44.3% of the total disposals of stock. From an analysis of the figures, it appears that reproductive troubles, such as failure to breed, and abortion, are responsible for the highest percentage (19.3). Udder diseases such as loss of quarter and mammitis, also constitute a high proportion (15%). Doctor Minett spoke of mammitis at one of the British Association's meetings, saying that we had no precise conception of the magnitude of the loss from this cause. The Scottish figures showed that tuberculosis accounts for a total of 7.6%, but losses from Johne's disease were practically negligible, which is a result of striking contrast to the general experience in the South of England.—*The Veterinary Record,* Vol. XI, No. 41.

WASTAGE IN NEW ZEALAND DAIRY HERDS

New Zealand has an excellent reputation as a dairying country, and in the Dominion much attention has been devoted to the milk-producers' problems. There is an interesting note in the annual report of the Department of Agriculture on the incidence of disease among dairy cows and the other causes of wastage in the Dominion's herds. A record has been compiled from 2,500 dairy herds comprising 128,000 cows. This shows that the wastage in these herds from all causes during the 1929-30 season was 10.7% of which 2.7% was on account of sickness or disease, including breeding troubles, and 5.3% on account of low production. It is claimed that these New Zealand figures compare favorably with those of other countries. In Denmark, for instance, the annual wastage is stated to be 16.7%, of which 10% represents breeding difficulties. In every country farmers feel the need for more active veterinary research. Disease troubles often defeat them.—*The Veterinary Record,* Vol. XI, No. 48.

BLESSINGS OF ANESTHESIA

Anesthesia in the hands of the veterinarian is a gift that is twice blessed. By its efficient use, he can facilitate his technique and standardize his methods. But above all, he can perform that greatest of services, the abolition of pain. As a disciple of Simpson, he may minister at the altar of painless surgery, than which no nobler ideal could inspire any professional worker. Before such an ideal the quack clinics and their ignorant staffs must stand condemned and their invasions be brought to nought. They represent vivisection in its worst form. Voltaire wrote of the eighteenth century priests what the public today should write of these quackery mongers. *Notre crédulité est toute leur science.*

The practice of efficient anesthesia by every veterinarian will do more than any other single factor to convince the public that our profession has attained to that highest of ideals—*Ich dien.*—Editorial, *The Veterinary Record,* Vol. XI, No. 48.

Mineral Deficiency Diseases

By R. A. McINTOSH, Guelph, Ontario
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DISEASES affecting live stock which occur as a result of a deficiency of certain mineral elements are becoming more prevalent. It would be difficult to estimate the losses resulting from these conditions, but they are large enough to warrant the serious consideration of all those interested in the live stock industry. Not only are mineral deficiencies interesting and important in themselves but also because of lowered resistance they have a bearing on the occurrence of other forms of disease. In some instances these deficiencies may have a very definite relation to the epizootiology of certain infections. Trophic and metabolic disturbances are frequent manifestations of these diseases. They are also associated with functional disorders.

Minerals which are commonly lacking are calcium, phosphorus, iodine and iron. Conditions resulting from a deficiency of any of these elements are more frequently observed during the winter and in the early spring at the conclusion of the long stable feeding periods than at other seasons or times. Calcium and phosphorus deficiencies produce nutritional disturbances affecting the bones and many functions of the body. Iodine deficiency causes goitre in the newborn and bears a definite relation to calcium metabolism because of its influence on the thyroid and parathyroid gland. Iron deficiency causes anemia which, for the greater part, is only observed in young suckling pigs. Certain of these deficiencies are more prevalent on farms or in localities where sandy soil predominates, or on land which has been repeatedly cropped or pastured without fertilization. Calcium is likely to be deficient on heavy clay soils which are acid in reaction. Dry seasons favor their occurrence and also mismanagement in the care and feeding of live stock.

*Presented at a joint meeting of the Central Canada Veterinary Association and the Ontario Veterinary Association, Brookville, Ont., July 10 and 11, 1931.

Calcium and Phosphorus Deficiencies

These two elements are so intimately associated in their body functions that they may be considered under the one heading for a deficiency of either one of them or a deficiency of the factors responsible for their assimilation produces the same symptoms in affected animals. It is only when the importance of these elements in many body functions and physiological processes are made known that the result of a deficiency in them may be appreciated. Calcium-ions are absolutely necessary for the normal tonus and for the spontaneous rhythm of organs with smooth muscle, for the normal activity of epinephrine and the parathyroid. Calcium modifies heart contraction and blood pressure, it lessens cell permeability and consequently transudation phenomena. Removal of calcium produces changes in the reflex excitability in the nervous ganglia and in the excitability of the peripheral nerves. Thus calcium-ions may be regarded as the physiological regulators of the nervous system. Calcium is present in the body in varying amount as an integral part of every living tissue and fluid, not in an immobilized form, but as an actively metabolising element participating as far as we know in all physiological processes of all organs. The very large deposit of calcium in the bony system—99% of the total calcium content of the body—serves not only the passive purpose of skeletal support, but as an active reserve from which calcium goes forth through the blood to supplement the cell calcium, if for any reason the latter falls below the minimum requirement of nature. Calcium metabolism is not an occasional affair, but as constant a process as, for instance, protein metabolism. By far the greater amount of the calcium in the body is in the form of a phosphate which indicates the complementary nature of these two elements in the body.

All domestic animals and poultry may suffer from diseases brought about through a deficiency of these elements. On Ontario farms it is most frequently observed in cattle and swine. It is probable that phosphorus is more often lacking than calcium, but in either case the ultimate effect is the same. The reasons for the occurrence of these deficiencies may be the result of a lack of the elements in the feed, or a lack of the factors responsible for their assimilation, such as the vitamins, or by being too closely housed and receiving insufficient sunshine. Pregnancy, heavy milk production and the rapid growth of young animals increase the drain of these elements and deficiencies are more commonly experienced under those circumstances. Usually at the end of the pasturing period in the fall, animals show no signs of the disease; for while they are on the grass, out in the open and exposed to the sun's rays, these elements are easily assimilated and stored up in the body. When, however, they are stabled in the fall and stall feeding operations are commenced the reserves of these elements may be used up and the animals, after a time, commence to manifest symptoms of the depletion of calcium and phosphorus.

A certain minimum of metabolic calcium is indispensable for the maintenance of life, so that if, on account of insufficient intake or of excessive demand, the calcium of the body cells especially, and sometimes also of the fluids, falls below the minimum, then serious consequences impend. A very efficient mechanism exists in the body for calcium regulation dominated as to fixation by the so-called vitamin D, and as to mobilization by the parathyroids. The parathyroids cannot function normally without a sufficient amount of calcium. Therefore it can be realized that if anything occurs, such as a lack of the vitamins or of calcium and phosphorus, or if there be too great an output of these elements, that derangements are likely to follow.

Through long continued cropping or pasturing soils become deficient in phosphorus and calcium. This lack is reflected in the roughage and grain produced and ultimately the animal consuming such food suffers. Dry seasons tend to aggravate the occurrence of these deficiencies. Animals suffering from a slow depletion of these elements at first manifest symptoms of lethargy, sluggishness and unthriftiness. They appear dull and, if lactating, the milk production diminishes. Calves will be noticed licking at wood, sucking leather, cloth or anything they may get hold of. These symptoms indicate a craving for something they are not getting, and if means are not taken to supply it the depravity of appetite becomes more marked, until they chew wood, bones, leather and other foreign material. Cows advanced in pregnancy, or milking heavily and young growing animals will probably be the first members of the herd to show these symptoms. It is a slow, insidious process and ultimately all of the available reserves of these elements in the body are used up and then the abstraction of calcium from the bones takes place. At this stage the disease assumes a more serious character, for with the removal of calcium from the bones they become painful, the animal gets stiff, lame and reluctant to move. Other body functions are impaired, flesh is lost rapidly, milk secretion is in abeyance and the appetite is affected as well. The bones become soft, are easily fractured and take on deformities. Finally the cow may go down and be unable to rise. In adult animals the term applied to this condition is osteomalacia. In young animals it is spoken of as rachitis or rickets. The specific gravity and mineral content of osteomalacia bones is low, in some instances only one-half of normal. The calcium and phosphorus content of other tissues and fluids of the body is also low.

In pigs rachitic-like symptoms appear most frequently after the young pigs are weaned—at an age of from six weeks to three months. Young pigs will sometimes show a depraved appetite by chewing at unnatural material and by fighting and chewing each other. Convulsions are also relatively common in young pigs and will be noticed often at feeding time. The animals may recover from these attacks of tetany in a short time, although occasionally they die.

Such symptoms are prodromic and indicate a deficiency which ultimately leads to bone disease. The aching of the bones, which occurs before changes in shape are discernible, causes stiffness and the animals refuse to move except when forced to, or at feeding time. They lie much of the time huddled in the bed, and if forced to move, squeal from pain. Some of them ultimately become hopeless cripples. The condition is often spoken of as rheumatism. While the symptoms are of a rheumatic character the disease is not. Adult pigs are not so frequently affected but undoubtedly some cases of posterior paralysis in sows are due to a deficiency.

In cattle the course of the disease is insidious in its nature, coming on slowly and gradually increasing in its intensity. The conclusion of the stable-feeding period, and when they are first turned out in the spring, is the time when the condition is most frequently observed. So long as the manifestations of the disease are confined to depravity of appetite the animals will usually recover under proper treatment in a reasonably short time, but when they become stiffened up the restoration of the mineral reserves is a slow process, often requiring months, and usually leaves some of them with permanent skeletal deformities.

Recognition, Treatment and Prevention.—The recognition of a calcium and phosphorus deficiency is relatively easy. When animals do not thrive and manifest a craving for minerals by licking and chewing at wood, bone, leather and other foreign material, the condition is obvious. The prevention and correction of it consists in providing adequate amounts of these elements in the winter rations and also correcting the management and care of the animals so as to overcome the loss of the factors which are responsible for the assimilation of these elements. One of the first things to take into consideration is the soil upon which the feed consumed by the animals is grown. When the disease occurs year after year, on a certain farm, or in certain localities, it is probable that the soil requires fertilization of certain character, which can be determined best by a soil analysis. Proper soil fertilization will insure the production of pasturage, fodder and cereals with adequate mineral content.

During the winter the feed of the animals may be supplemented by the addition of bone meal to the grain ration at the rate of three or four pounds of bone meal to the 100 pounds of grain. The feeding of bone meal should be made a routine measure on farms where calcium and/or phosphorus deficiency is known to occur. Cod liver oil should also be fed during the winter because it contains vitamin D, essential for the assimilation of calcium.

In the matter of feed it should be remembered that the leguminous roughages—that is, the alfalfas, clovers and peas, etc.—are rich in calcium and phosphorus and should be provided whenever practicable. It may be advantageous for stock raisers in districts where these deficiencies are prevalent to dispose of some of their home-grown forage and purchase alfalfa produced in localities where animals do not suffer from this disease. The grain ration should be varied in character with a liberal supplement of bran and oil cake which are rich in phosphorus. In the management of the herd the value of an hour or two in the open on all bright, sunny days is likely to be under-estimated. The direct rays of the sun play a very important part in the assimilation of these mineral elements and in activating the vitamin responsible for their assimilation. The stabling quarters should be well lighted, kept clean and wholesome. Grooming is of considerable value and means much to the well being of the animal, together with close observance of the individual's capacity to relish its food. Pregnant animals, those milking heavily and young stock should receive special consideration. If the condition becomes so advanced that marked depravity of appetite is noticed or the animals are becoming stiff, a veterinarian should be consulted, for under these circumstances they will require special skilled attention. When cows get stiff and lame, one of the most useful agents to administer is dilute phosphoric acid in half ounce doses three times a day, along with digestives and tonics such as pepsin, nux vomica, ginger and arsenic. In young

pigs stiffness is often corrected by the administration of cod liver oil and suitable modification of the diet.

Iodine Deficiency

It has been determined that iodine deficiency in man and animals is largely a matter of geographical location. Those provinces and states bordering the Great Lakes region are, in general, iodine deficient regions. Iodine deficiency seldom manifests itself in any appreciable manner in the adult. Its recognition is usually in the new-born by the occurrence of congenital goitre. It occurs in the young of all domestic animals, perhaps more frequently in some localities than others.

Indications of Iodine Deficiency.—The term goitre is applied to an enlargement of the thyroid body. The thyroid is an endocrine gland, the secretions of which are essential to the normal development of the animal. In animals the thyroid gland is located on the lower side of the neck close to the region of the throat. If for any reason the secretion of the thyroid is lacking either in the fetus or the young after birth, certain manifestations occur. Young pigs are born without hair, their skin is dry and feels doughy. Very often they are stillborn or die shortly after birth. With lambs much the same symptoms are seen. What wool they have is in the form of coarse, dry hair, and if born alive they are usually weak. In foals and calves the mortality is perhaps not so high but they too are weakly, do not thrive well and are more susceptible to other disease. Invariably in all of these animals the thyroid gland is greatly enlarged, giving rise to the common term "Big Neck."

Prevention.—The ability of the thyroid gland to elaborate its secretion is dependent upon the presence of a sufficient amount of iodine. It requires only a small amount of iodine but this must be available, otherwise the gland will not function and the normal development of the body is retarded. To prevent the occurrence of goitre in the new-born, iodine in sufficient amounts must be provided. Farmers whose new-born animals show symptoms of goitre should provide iodized salt for the dams or if they prefer they may mix four ounces of potassium iodide with every hundred pounds of common salt provided for the animals. All live stock requires iodine, and more particularly during the winter months when the feeding of cured roughage and ripe grains obtains.

Iron Deficiency

Anemia, a condition affecting the blood of young suckling pigs, is now recognized as being due to a lack of iron, the majority of cases being seen in winter litters. The reason for its occurrence lies in the fact that sows' milk is very low in iron, and in stabled quarters the young are unable to procure it from any other source. In the summer when the pigs are quartered outside, the condition seldom appears. From a lack of iron the blood of the pig becomes thin and watery. White breeds of pig instead of having pink skins become a pasty white. With an impoverished blood stream the little fellows do not thrive, lose their powers of resistance and become more susceptible to other forms of disease. Quite frequently whole litters will be lost in a short time, primarily as a result of this deficiency. As a rule anemia is most marked in the little pigs at the age of about two weeks.

Up to the present time no simple means has been devised to enable little pigs to get iron for themselves. However, with but little trouble they may be dosed individually. Reduced iron is probably the most acceptable preparation to use for this purpose. The quantity required is quite small, as much as can be lifted on a little wooden spoon whose diameter is not greater than that of a ten-cent piece, being quite sufficient. Dosing with iron should commence when the pigs are a week old and should be repeated every third day until they are three weeks old. The reduced iron is put into the mouth.

Sods taken up in the fall and kept until such time as the sows farrow and then placed in the pen so that the little pigs may root at them and eat a little of the dirt affords another means of preventing this

condition. If reduced iron, one part, is mixed with powdered charcoal, 10 parts, by weight, and sprinkled on the sods or on a clean place on a floor it would perhaps be a more certain way of having iron available rather than to depend on the sods alone. This may suffice in those instances where farmers do not care to dose them individually. The pens should be kept clean, be well lighted and warm. If the pens are too cold the young pigs tend to remain hived in the warmth of the bed and may fail to root around and get the iron.

Conclusions

Veterinarians and live stock men know the need and value of common salt for animals. The elements referred to in this article are almost equally important. These facts reveal the necessity of those interested in the health of animals, acquainting themselves regarding mineral deficiencies, and in order to prevent losses using these simple means to prevent them.

A useful mineral mixture for cattle for the prevention of iodine, phosphorus, and calcium deficiencies, is made by mixing: potassium iodide, one-quarter pound; common salt, three pounds; chalk, ten pounds; and bone meal sufficient to make one hundred pounds. This mixture is added to the grain ration at the rate of four pounds of the mixture to one hundred pounds of grain.

As a mineral mixture for swine, charcoal, four bushels; iodized salt, ten pounds; bone meal, ten pounds; sulphur, two pounds; and iron sulphate, one pound, may be mixed together and placed in self feeders in the pens so the pigs may eat it at will.

MILLIONS LOST ON EGGS

Bad eggs last year cost Illinois farmers losses conservatively estimated at $5,000,000, according to H. H. Alp, poultry extension specialist of the College of Agriculture, University of Illinois. Most of this loss can be traced to production of fertile eggs during warm weather. Keeping all roosters out of laying flocks during the summer would be one of the greatest steps toward improving the quality and reputation of Illinois eggs, Alp said.

INJURY TO A BULL

A client of mine purchased a pure-bred Hereford bull at a stock show a year ago. This bull was used on a pure-bred herd; the herd was grazed on a high brush pasture during the summer. Nothing was noticed wrong with the bull when seen about the middle of June. During a very hot dry spell a month later, this bull was next seen. At that time he was found hanging around a water hole with his prepuce badly swollen, the penis dangling and soiled.

I was called two days later and attributed the trouble to an injury and cleaned the penis thoroughly with an antiseptic solution and directed the owner to bathe the swollen parts with hot water twice daily. I also left a soothing lotion to be applied to the injured, exposed glans and prescribed an iodide internally. Urination was unimpeded and the testicles normal at this time.

I did not see this bull again for two weeks. At that time, the swelling of the glans had diminished considerably, but there was a firm hard swelling between and posterior to the two spermatic cords or at the S shaped curve of the penis. The bull was cast and a deep seated abscess opened at the site of the enlargement. The discharge had a dirty, foul, greenish, watery appearance.

Healing followed immediately. The penis retracted and the bull made a complete recovery. He was then returned to the herd, but now he seems to have lost some power of retraction and erection. The penis does not normally retract into the S position. Healing of the cavity formed by the abscess may have left adhesions which obstruct it or it may be due to a thick portion in the sigmoid flexure, which does not bend readily or to injured retractor muscles.

What treatment would you suggest? I suggested leaving it to nature. Several times in my practice, animals that have been considered hopeless as to recovery have made good recoveries by giving them plenty of time. However, winter coming on and the penis still dangling from the prepuce makes the owner anxious to do something. He has had practically no service out of this bull.

How would you proceed to draw a bull's penis out of the sheath for examination?—*B. B. C.*

Reply: In the bull, injury to the penis is perhaps more common than in any other of our domestic animals. There are many reasons for this, if we take into account the anatomy and the character of service that bulls give. As you know, the service of the bull is quite different from that of any other animal and then the penis lies exposed to injury, almost all the time.

My belief, without seeing the case, is that this bull was injured in some way. Let me cite a typical case where we were able to trace the injury. I was called in consultation some two or three years ago to see a very valuable Jersey bull. The veterinarian told me over the phone that the sheath and all around the penis was badly swollen and blue and that urine seemed to be oozing through the skin—that he could both see it and smell it.

I went down and did as you have done. We laid the bull down to make a proper examination, and we found the penis doubled back into the sheath. It was my judgment that the bull had been kicked from the rear with a heavy boot, and we later found this to be true. This, to a degree, paralyzed the end of the penis and the next day when the bull was taken out for service the semi-erection caused the penis to turn over, so to speak, and double back and, of course, urine was leaking out from the injury. The bull was in a semi-comatose condition from uremic poisoning and I advised destroying it, because the penis would have had to be amputated anyhow, and I didn't think he had a chance to live.

I am inclined to think that some similar injury has happened to your bull, not necessarily by a person, but by chasing a cow or jumping a fence, or something, and the injury has been severe enough to affect the motor nerves, and that is why the penis cannot be retracted and, as you state, there may be adhesions there also. It might be well for you to lay the bull down again and feel for adhesions. You know, of course, that we can cut through the bottom of the sheath, that is you can cut what is called the venter side of the sheath and put your finger in and feel around, breaking the adhesions if you find any, and the wound should heal without doing any harm.

If there is a thickening around the sigmoid flexor, a mild irritant to stimulate absorption would do no harm and might do some good. I would also put the bull on stimulants, just on general principles. I would prefer Fowler's solution and nux vomica in good size doses, gradually increasing the dose and then stopping for a time, and then beginning again. Use the same good judgment you have shown already by telling the owner not to do too much, but to rely largely on nature.

As to your question as to how far you can draw a bull's penis from the sheath for examination, the answer is: As far out as it will come with moderate traction. Slip a clean bandage around it and then apply gentle traction, but by no means enough to injure it. I should say, in the case of the average bull, perhaps you could draw it out somewhere between 5 and 10 inches.—J. F. D.

Over 11 million pounds of wool and mohair was shipped from San Angelo, Texas, in 1931.

If the virus of hog cholera were as dangerous to human life as is the virus of rabies, or as the organisms of tuberculosis, it is unthinkable that it would be put in the hands of any but the most skilled, or its use permitted in treatment except under stringent regulations. However, hog cholera virus is as deadly for hogs as rabies is for dogs or tuberculosis for cattle. Yet in many places anyone may use this highly virulent virus in the treatment of swine even though the premises become a dangerous center of infection for the neighborhood. Human life is affected only indirectly through lower returns or losses from the hog lot and less meat in the smoke house. As a radio announcer says, "You can fool yourself, but you can't fool bacteria."—Mark Welsh.

Common Diseases of the Mouth and Esophagus of the Dog

By H. J. MILKS, Ithaca, New York

THERE are so many diseases of the digestive system that it is impossible to discuss them all in a paper of the length of this one, or to more than bring out a few points in those which will be included. Since there are no definitely positive symptoms of most of these diseases, a differential diagnosis must depend upon a physical examination, frequently supplemented by a microscopical examination.

Examination

Briefly the examination of the upper digestive system may be outlined as follows: First, examine the mouth for odor, exudate, lesions and foreign bodies between the teeth. Glance under tongue for cysts (ranula). Check the teeth, tonsils, and pharynx. Palpate the pharynx and esophagus externally for obstruction.

Hare-Lip

This condition is so well known that it needs no description. It is congenital, sometimes affecting one, and sometimes both lips. It is often associated with cleft palate, and sometimes the deformity is so great as to prevent the puppy from nursing. The ones I am to discuss are those seen on half-grown or adult animals and which serve only as a disfigurement.

Treatment—Our plan has been to operate under morphine plus a local anesthetic injected around the cleft. We scarify the edges well with scissors or knife; then bring the scarified edges together with silver wire sutures, and mold or bend the wires so as to bring the edges in the desired position. The silver does not suppurate nor tear out easily and may be bent at different times to hold in proper apposition. Another method is to pass a pin through the clefts and hold it in place by figure eight looping of a silk thread around it. Not all cases will be cured at the first attempt. The operation is not 100% effective and may have to be repeated. Most cases will heal with little disfigurement.

Warts in the Mouth

By these are meant the papillomata which are so common in young animals. These growths are supposed to be infectious, in cattle they have been determined to be due to a filtrable virus but so far as I know, their cause in dogs has not been determined.

Treatment.—The treatment for warts is described as medicinal and surgical. The medicines ordinarily recommended are arsenic and iodine. Since they often appear rapidly and disappear just as suddenly, one is never certain of the benefits of medical treatment. Our plan has been to snip them off with scissors and touch the stump with a cautery or to burn them off with a cautery. When they are present in such numbers that it does not seem best to remove so much mucous membrane, we remove what we consider a sufficient number and leave the rest for another time. The mucosa heals promptly and we then remove more. We have seen cases in which we did not believe it feasible to attempt to remove them surgically and it may be interesting to note that these cases have never recovered under internal medication.

Pus in Antrum

The symptoms of this condition are a swelling, abscess or discharging sore just below the eye. Usually there is a history of inability to heal the sore or to keep it healed but in some cases only a hard swelling or bulging of the bone is seen beneath the eye. Upon probing the sinus, one notices that the probe penetrates bone and passes downward in the direction of the molar teeth. The cause is almost invariably located in the large shearing upper molar (4th premolar) and the sore will not stay healed until this tooth has been extracted although in many instances the tooth appears sound. Extraction of these teeth is not easy, but

may be facilitated by dissecting the mucous membrane away from the tooth, loosening the tooth with an elevator and by splitting it transversly. After extraction make sure that there is a sufficient opening between the sinus and tooth cavity to permit adequate drainage; enlarging it if necessary. Clean daily with an antiseptic. If the apparently sound teeth found in this condition are broken, a decayed spot will invariably be found within them. A case report illustrating this disease will be found in another place in this issue of VETERINARY MEDICINE.

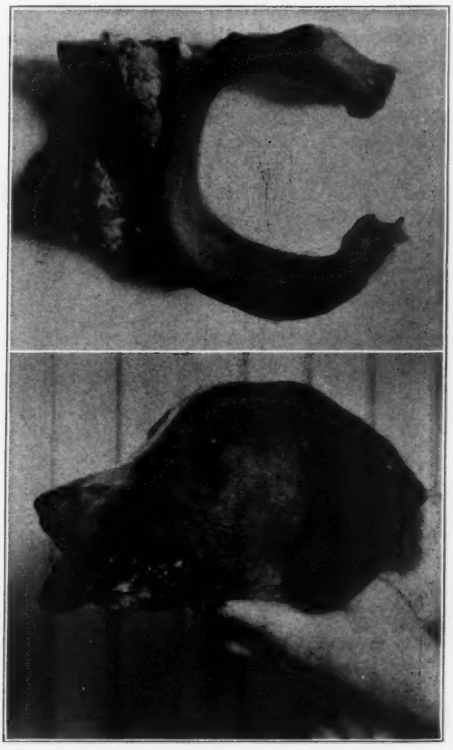
Foreign Bodies in Mouth and Pharynx

This seems like a simple thing to speak of in this place but, nevertheless, it is important to remember to look. We have had a dog sent in for black tongue that recovered promptly after the removal of a bone from between its teeth. In another instance a cat was able to shut its mouth after the removal of a loose molar. In this instance the owner gave the history of a sick animal and attributed the trouble to eating too much fur from a rabbit. This particular animal appeared as though the jaw was broken but upon examination we noticed that the cat moved the jaw but could not entirely close the mouth. Nothing could be found between the teeth, but after a little probing a loose tooth was discovered. It had simply dropped down enough to cause all the trouble.

Obstruction in the Esophagus

Symptoms. The symptoms vary with the position of the obstruction. Anorexia is said to be common in all cases of pharyngeal or cervical choke although we just had a case of pharyngeal obstruction in which the animal was hungry but could not eat. In the deeper forms the dogs are often hungry. Coughing, choking, gagging, and repeated attempts at deglutition are more pronounced in obstruction of the upper part of the esophagus. When the obstruction is in the pharynx, the head is outstretched; there are increased swallowing motions, salivation, retching, choking and in some cases suffocation. In cervical choke there is less swallowing, less salivation, and less retching than in the case of obstruction of the pharynx.

When the foreign body is in the thoracic region or just anterior to the stomach the foregoing symptoms are less marked or entirely absent. The animal is often ravenously hungry but is unable to retain anything but liquids and not always these. He will eat, swallow and almost immediately return the material. The regurgitation is very prompt and is diagnostic of some obstruction. If the obstruction is not com-



This dog was presented at the Veterinary Clinic of the Ohio State University. The tongue was greatly swollen and black in color, due to constriction by the fibrous band shown above, which appeared to be a section of aorta at its junction with the heart. The circulation in the tongue had been cut off for 21 hours. The band was removed by cutting it as shown with scissors. On the fourth day afterwards, the tongue sloughed off close to its base, leaving the animal unable to eat or drink but hungry and able to handle solids and liquids when they were placed in his mouth.

plete he may retain liquids but not solids. We have seen this inability to retain food as the only symptoms shown and have had it diagnosed as gastritis and as worms.

Diagnosis. This may sometimes be made from the history, but unless the owner has actually seen the animal get into trouble while eating a bone the statement that the dog has a bone in his throat is usually misleading. The location of the body makes some difference in ease of diagnosis. The obstruction may be felt in the pharynx through the mouth or side of the neck or often may be seen if the tongue is pulled forward. If in the cervical region, the bulging or swelling can be noted or the body palpitated easily. The symptoms which are almost pathognomonic of obstruction in the thoracic region, are: immediate regurgitation of food after eating and the ability to swallow and retain liquids and not solids. In other words, when an animal appears hungry, eats and swallows food but immediately returns it, or where it can retain liquids but not solid food, look for deep obstruction. In cases of doubt, or to clinch a diagnosis, pass a probang or stomach tube. To do this hold the mouth open with tapes or a speculum, raise the head so that the mouth and esophagus are in a nearly straight line and pass the tube in the upper middle part of the mouth. When it reaches the pharynx the animal will invariably swallow, then pass on down to the stomach or until the obstruction is reached. This is an easy procedure and one that will give almost positive results. The passing may be preceded by a narcotic or anesthetic if desired. One can feel the tube in the esophagus or in case of doubt as to whether it is in the trachea or not, immerse the free end in a dish of water. If the tube is in the trachea bubbles of air will pass through the water during expiration.

Cysts are common in the mouth and throat region of dogs. They vary in size from the smallest up to the enormous cyst shown here which was presented at the Veterinary Clinic of the Kansas State College. Often when seen in the mouth, the larger cysts extend into the region of the throat or being in the throat, extend into the mouth. In the mouth, the cysts are commonly attributed to an obstructed gland duct, but it is by no means certain that this is always or even usually the cause. It seems likely that at least some of these cysts are due to an abnormal development of the embryonic gill slits. Their treatment requires the removal or destruction of the secretory lining membrane. This may be done by a mild cauterizing agent or by dissection. Where the latter method is adopted it is best to first evacuate the contents of the cyst through a small incision and then pack the cavity with absorbent cotton. Care must be exercised to leave not even the smallest portion of the secreting membrane *in situ*.

One difficulty lies in estimating when the stomach is reached. The esophagus passes through the upper third of the diaphragm a little to the left of the median plane, and enters the stomach below the eleventh or twelfth dorsal vertebra. As the dog has thirteen ribs one can begin at the posterior one and count forward one or two, trace this up to the vertebra and the opening will be ventral and well up toward the back or it will be about opposite the ninth or tenth rib at its upper third. Measuring from the incisor teeth to the above point will give the approximate length of probang to pass in order to reach the stomach. If the obstruction is reached mark the tube where it enters the mouth, then withdraw and lay it upon the side of the dog with the marked place at the incisor teeth. The end will then indicate the location of the obstruction quite accurately.

Prognosis. The prognosis depends upon the nature of the obstruction, the length of

time it has been in the esophagus and its location. Generally the prognosis is more favorable in a pharyngeal than in a cervical choke and more favorable in a cervical than in a thoracic choke. If the body has sharp points it will soon set up inflammation or injure the esophagus beyond repair so, naturally, the outlook is better with smooth than sharp foreign bodies. The size of the offending body is also important. We have seen a small pekingese puppy suffocate on account of a chop bone in the pharynx. This particular bone was so firmly imbedded in the tissues that it could not be removed without being broken up and the puppy died before that could be done. A tracheotomy might have been useful in this case but no such outcome was expected, and the puppy died before it was attempted. The sooner the body is removed the better since in only rare instances will fatal necrosis be avoided if it is left in more than a few hours. In one instance we had a recovery follow removal of an obstruction that had been *in situ* ten days, but this was a round body that did not completely prevent the passage of liquids, and, of course, could not have caused much damage.

Treatment. When the obstruction is in the pharynx an attempt should be made to remove it through the mouth. If of such shape or in such position that this cannot be done one might break it with a bone cutter, but during such procedure the animal is liable to suffocate unless tracheotomy is previously performed. Since suffocation occurs only occasionally, and many times without any previous alarming symptoms, the above precaution is not usually thought of until the animal has passed out, and the veterinarian thinks about what he might have done if he had thought of it in time.

If the obstruction is in the cervical region, attempts should be made to return it to the mouth or in some cases to push it into the stomach, but the last measure is always hard medicine except in special cases where the nature of the body is known. Fishbones or other small objects may sometimes be removed with the horsehair or bristle probang. If the obstacle cannot be removed by these means, proceed at once to an esophagotomy. The operation is briefly described as follows: Pass a probang or sound down the esophagus against the body. Cut down upon this from one side and it makes little difference which, separating the muscles instead of cutting them.

Then make a longitudinal incision in the esophagus long enough to permit the removal of the foreign body. Treat the operating area as an open wound. A few sutures may be placed in the esophagus if desired, but they are not necessary in most cases. For a successful termination these cases must be operated upon early. Delay is dangerous if not fatal, and certainly is a greater source of danger than the operation itself.

An obstruction may be removed from the thoracic region either through an incision in the esophagus just as it enters the chest or more often through a gastrotomy. In the latter case laparotomy is performed just posterior to the sternum, the stomach brought out and incised transversely on its greater curvature, and an attempt made to remove the body with instruments passed into the esophagus. We have found long dressing forceps and a small obstetrical hook quite useful and in one instance succeeded in removing a bone that was six inches anterior to the stomach. Gentle traction should always be used so that the tissues will have a chance to dilate and the least possible injury will be done by the operation. After the body has been removed suture the opening of the stomach with two rows of sutures; the first a continuous row that penetrates all three coats, and the second a continuous Lembert suture. We prefer a No. O medium hard chromic gut threaded in a round pointed needle for this work. However, silk or certain other suture material may be used if desired. The round pointed needle is important as it pushes its way through the tissues and does not cut them. The abdominal opening is closed in the usual manner. Special intestinal sutures are now available in which the needle is clamped to the cat gut in such a way that only one thickness of the suture is dragged through the needle opening. In a somewhat similar way silk is available.

Elimination in the Dog

By ROY H. SPAULDING, White Plains, New York

IF the majority of dog owners showed as much interest in controlling the processes of elimination in their pets as they do in concocting some elaborate but worthless meal they would keep their animals in a much better state of health. They willingly spend hours cooking up a mess of bones to a thick greasy soup, thicken it with rice, cornmeal, macaroni or bread and look with pride on their achievement. But if you ask them to spend a few minutes a day checking up on elimination they assume an aggrieved attitude. They cannot be bothered with such insignificant trifles.

Unfortunately, many are supersensitive about discussing, or even thinking of, the body functions. This attitude is the result, of course, of the mistake our forefathers have handed down of treating such matters as tabu, to be discussed only by the elders in the family circle and then with great embarrassment. Such beliefs are fortunately changing and people more and more realize the folly of considering the normal body functions in any light other than natural physiological occurrences.

People, however, generally fail to realize the importance of a clear knowledge of the character of the elimination, and since it entails a disagreeable bit of work they are not easily influenced to think seriously of the matter. They exhibit a look or horror when asked for a specimen largely because they fear it will mean a great deal of work to obtain it, while in fact even the collection of urine is extremely easy.

Most sickness is primarily due to the failure of the proper elimination either through the bowel or the urinary tract. This is even more true in dogs than in the horse or man, because of the lack of sweat glands. There are many points of interest with regard to elimination which, although they are common knowledge to veterinarians, may, if discussed with certain aims in mind, refresh the memory, or bring out some new thoughts regarding this function in health and disease.

The normal feces of the dog depends upon the character of its food. The digestibility of the different types of food varies a great deal more in dogs than it does in man. The fact that the dog is a carnivore and that man is omnivorous is often lost sight of, not only by the laity but by veterinarians as well. An attempt is made to feed dogs in the same manner and on the same kinds of food that his owner eats, and herein lies one of the greatest difficulties with which the veterinarian has to contend.

It should be remembered that the anatomy of the digestive tract of the dog varies as much from that of the human as the human digestive system varies from that of the horse. A natural requirement of first importance in feeding the horse is bulk, while in the dog the chief aim should be concentration.

Meat is so thoroughly digested by the dog that there is but little residue. When this animal is fed meat exclusively there will be but a small amount of fecal matter. There is usually not more than one passage a day. The evacuation is cylindrical in form, small in caliber, very firm in consistency and black or brownish black in color. Feces from cooked meat is about the same as from raw meat except that because there is less nourishment for the dog in cooked than in raw meat the amount of residue from the former will be somewhat greater in amount since a larger quantity of cooked meat will have to be given in order to supply the same amount of nourishment that a lesser quantity raw food will supply. This same principle applies to all other foods in direct proportion to the amount of nutritious material they contain and the relative thoroughness with which they are digested.

The residue from horse is similar with that from beef, but when the dog is first fed on horse meat he will usually develop diarrhea until he becomes accustomed to it. Liver likewise may cause a diarrhea which is light yellow in color and the feces from a continuous liver diet will be inclined to soft-

ness and to be of a light brown color. Fat gives a dark grayish brown feces. Bones produce a grayish discharge, very hard and dense in consistency, which turns white on drying and crumbles to a powder.

Dog crackers are very well digested, but leave a large amount of residue, and consequently the bolus discharged is of large caliber and longer than that from meat, and there are more frequent passages, somewhat soft in consistency and brown in color.

Certain brands of crackers when first fed to the dog may produce sloppy feces for a few days until the dog has become accustomed to them. Sometimes this will happen when a change in the brand of crackers is made and occasionally a certain brand of cracker will consistently give a particular dog loose bowels. Crackers when soaked in milk or soup produce more copious feces, having a much stronger odor than when fed dry or barely dampened. This is a very important point, for it shows that the good qualities of the cracker lies in the baking to a hard concentrated consistency and therefore it should be fed in that form.

Soft cooked cereals, such as cream of wheat, cornmeal, and rice produce frequent copious brownish discharges. Shredded wheat and bran often produce a peculiar, dark brown discharge of spongy consistency. When this dries out the flakes of bran can be distinguished clearly, showing that they have come through the intestine unchanged. These cereals are therefore of no food value and serve only as a roughage to add copiousness to the feces and to produce more frequent evacuations. The feces from whole wheat bread corresponds closely to that from dog crackers. White bread produces a clay colored discharge very large in caliber and of a very offensive sour odor which is intensified when the bread is soaked in milk.

In the great majority of our house dogs, vegetables are passed in the feces just as they are taken into the stomach, absolutely undigested. The practice of mashing and straining the vegetables may to some extent increase their digestibility. The hardy terriers, such as the Sealyham and Airedale, are notable exceptions. Feces from vegetable feeding are copious in amount, the color depends upon the type of vegetable used. It is generally thought that vegetables are necessary to round out the dog's diet They are supposed to have a laxative action, and when properly digested they most certainly do, but in a great majority of our dogs they are not digested and consequently any beneficial action is questionable. The bulk which they supply tends to stimulate peristalsis and the moisture which they contain helps to keep the feces soft, but when they consistently go through the bowel undigested they act as foreign material, causing irritation and thereby impairing the digestion.

The feces of suckling puppies resembles in appearance thick pea soup, green or yellowish green in color. After weaning the feces gradually become brown or light brown in color and of the consistency of cooked cereal. As the puppy is given solid food the discharges become more formed and resemble that of the adult dog according to the type of food used. An old dog is more costive than the young dog on the same food.

The color of the feces may be changed by the use of certain drugs. Calomel and bismuth stain the feces greenish black; iron makes them black. The presence of bile produces a yellow feces. When there is a suspension of the flow of bile the feces will be grayish white in color and clayey in consistency.

There is very little odor to normal feces. When the dog is fed on bread and milk or vegetables the evacuation gives off a more offensive odor than when the diet consists of meat and crackers. This is due to the greater amount of carbohydrate in the food and the subsequent fermentation of that portion which escapes digestion. A pronounced odor is likewise observed when any condition is present which impairs digestion. Bile in the feces gives a particularly offensive odor. The evacuation from a dog with the intestinal form of distemper carries an odor which is characteristic of the disease. In cases of long standing constipation, especially when it is caused by bones, the odor is greatly increased. In certain breeds of dogs, such as the Boston terrier and the bull-

dog, it is usually noticed that they pass a great deal of gas, having a very offensive odor in spite of the fact that their digestion seems to be perfect. This is one of the most obnoxious characteristics of those breeds.

There are many abnormal conditions which affect the character of the evacuation. If the feces contain large quantities of food that is ordinarily easily digested, or of food material that shows little evidence of having been digested, a disorder of the stomach or intestines is indicated. The condition may also be due to any condition which brings about an increased peristalsis, thereby forcing the food through the intestinal tract before it has had time to digest. This may be brought about by fright, by the presence of irritants in the food or from the administration of laxatives. Foreign bodies when found in the feces usually have some significance. The presence of stones, gravel and dirt in the evacuation of puppies usually suggests a deficiency of calcium. Wood and coal suggest the need of carbon.

There is a type of gastro-intestinal catarrh, the origin of which lies in most cases in improper feeding. The great tendency to feed young puppies huge quantities of sloppy food is to a great extent responsible for this condition. The presence of worms is also a contributing cause.

Some puppies, even when they are in the pink of condition, free of worms and whose food has been of the best quality, possess a mania for consuming foreign material. In such animals it seems to be impossible to vary the food in any way which will prevent this depraved appetite. In some puppies the eruption of the permanent teeth is attended with a great deal of discomfort and they seek relief through chewing foreign material. In older dogs this habit is usually traceable to improper feeding or worms, but in a good many cases there is some obscure underlying cause of which we as yet have little knowledge.

Mucus, blood and pus may be found in the feces. Pus indicates the bursting of some suppurative focus in the intestinal tract or anus. Blood comes from a lacerated or eroded area on the mucosa. When it is found in clots or streaks lying on the surface of the discharges, it has come from the anus, rectum or the lower part of the large intestine. Sometimes a few drops of blood or bloody mucus are passed at the termination of a bowel movement. The movement may be normal, or nearly so, and in such instances the suggestion is an inflammation in the rectum. It is, however, more often seen in a dog that is suffering from a prolonged attack of diarrhea or dysentery, and in these cases the blood probably originates well up along the intestines. Not infrequently we see enormous evacuations which contain a large amount of blood, or may even have the appearance of being pure blood. Such a condition naturally suggests the presence of a very grave lesion, but as a matter of fact it usually disappears under treatment as quickly as it developed. Blood in the feces originates from lacerations of the mucosa by bones or foreign substances, from erosions of the intestine caused by worms or it may be due to acute or chronic ulcers.

Mucus is very frequently found in the evacuations of the dog and arises from a chronic inflammation of the gastro-intestinal tract. When mucus is found on the outer surface of formed discharges it shows the inflammation to be in the lower part of the intestine. When mixed with the feces it arises in the anterior portion. When mucus occurs in small quantities, and only occasionally, it indicates a slight inflammation, due in all probability to a dietetic disturbance. However, mucus is passed very frequently in enormous masses and often mixed with blood. In fact, cases will be seen where for days the dog will seemingly pass nothing but mucus. Such a condition usually means a heavy infestation of worms. When the dog is in good condition and full blooded the suggestion is whip worm, but if the dog is thin and the visible mucus membranes are pale it is diagnostic of hook worm.

When the consistency of the feces is abnormal it may vary in either direction. That is, it may be too hard or too soft. The presence of a hard stool is in general termed constipation. In practice we are in the

habit of subdividing this condition to describe more accurately the degree of the abnormality. We speak of the dog as having sluggish bowels when the quantity of feces is below normal, for the character of the food, and has a tendency to be dry. We speak of the dog as being costive when the discharge is hard and dry. He is constipated when he passes a hard dry bolus with difficulty. And when he is unable to relieve himself it is termed obstipation. At the other extreme we speak of loose bowels when the feces are semisolid in consistency, as diarrhea when they are watery and as dysentery when many liquid movements are passed accompanied by severe straining.

Costiveness almost invariably results from the combination of a lack of exercise and the consumption of too much food. When the muscles of the body are not active the food requirements for upkeep and repair are very low, and, oddly enough, the desire for food is oftentimes great. When the intake of food is beyond the need of the body there is a certain amount of storing up of the food products in the various tissues. When the external muscles of the body are inactive, the internal functions likewise are slowed down. The task imposed on the digestive apparatus is beyond its ability to perform, and a portion of the food material passes on incompletely digested. This brings about an increased demand on the lower bowel and gradually the food material accumulates and eventually the bowel becomes sluggish and the animal costive.

Dogs that are by nature clean, readily develop chronic constipation when they are kept in the house or kennel too long, without an opportunity to relieve themselves. In old, fat, lazy dogs that lie around the house the digestion becomes sluggish and there is a great tendency towards constipation.

There are many contributing causes which help to produce or are directly responsible for constipation. Among the most important of these are the local affections about the region of the anus and rectum which discourage an attempt to defecate. Notable among these are a matting of the hair about the anus, a swelling or abscess formation of the anal pouches, abrasions, and wounds of the anus, tumors, and, in young puppies, *atresia ani*. It may also result from proctitis, strictures in the rectum, extreme dilatation or diverticulum of the rectum, from enlarged prostate glands and tumors in the perineal region. Fractures of the pelvis, tail or limbs, or wounds in these regions, tend also to discourage the attempt to defecate.

In rheumatism and lumbago and in diseases of the spine, constipation results from the failure to attempt defecation either from the pain or inability to get into position. Fractures of the pelvis are sometimes so extensive that the lumen of the pelvis is so greatly decreased in size that the passage of a large bolus of feces is prevented. Tumors in the abdominal cavity, pyometra and occasionally pregnancy tend to cause constipation. Accumulations of bones, hair, sticks, grass, and other foreign material in the rectum often makes defecation painful and the evacuation is consequently retained.

Constipation is seen in the early stages of all febrile diseases. The cause of this may be either that the increased body temperature dries the feces or the depression of fatigue accompanying the fever tends to delay the attempt, or both. Constipation accompanies many chronic affections of the internal organs and cases of obstruction of the bowels. Constipation often occurs in acute diseases of the upper digestive tract such as: stomatitis, pharyngitis, and catarrh of the stomach and intestines. In the latter it usually alternates with diarrhea. In intestinal toxemia and acute nephritis the bowel is very sluggish and often completely constipated. Costiveness, or perhaps constipation, is a symptom in peritonitis and catarrhal jaundice.

Complete obstruction of the bowel may result from a decrease in the size of the pelvic circle, from strictures in the intestinal wall, adhesions, from the presence of large foreign bodies, from intussusception or twisting of the bowel or from strangulated hernia.

Diarrhea results from some condition which causes an irritation or an inflammation of the intestine and the severity of the diarrhea is almost always in direct propor-

tion to the intensity of the cause. As has been pointed out before, diarrhea may be due to an idiosyncrasy of the particular dog to certain foods. In most of these cases the system soon adjusts itself to the peculiarities of the food and the diarrhea automatically subsides, but now and then you will find a case where a certain animal will continually have a loose bowel when fed a certain food. Diarrhea, however, is usually a symptom of a catarrh of the intestine. This may be due to unwholesome and improper food, or too much food, to foreign irritants and to cold. In extreme hot weather and in the spring and fall, when the weather conditions are very changeable and when we are having cold, rainy spells, diarrhea often develops. In the more severe cases the cause may be distemper, infectious hemorrhagic gastro-enteritis or poisoning. It may be due to hook worms, whip worms, and sometimes to round worms.

In diarrhea the discharges may be of the consistency of pancake batter with a moderate number of evacuations in 24 hours. In such cases, when the color of the discharge is light brown, it indicates a mild disturbance of the intestines; when the color is yellow it shows that the liver is involved. A good purging and short rations for a few days is usually adequate treatment. In more advanced cases, when the evacuation is watery in consistency, it may be at first yellow in color, but later becomes brown and finally almost black. There will be many movements a day, and as the condition progresses straining will be in evidence after each evacuation. In very severe cases intense straining is a predominant symptom; the discharge is copious, watery and has a foul odor. Blood may be present in greater or less quantities. When hook worms or whip worms are the causative agents, blood and mucus are very much in evidence and the color is usually a slate gray.

Tenesmus may result from either constipation or diarrhea and is always indicative of a very severe condition. When it is accompanied by a loose movement, the cause is self evident, but when there are no results from the straining, caution should be used in assuming that the dog is constipated. If an irrigation is not given, at least a digital examination of the rectum should be made to positively determine the presence or absence of a hard immovable feces since under certain conditions of retention of the urine the animal will assume a position in trying to urinate which may be mistaken for an attempt at defecation.

The continued use of mineral oil will frequently cause a seepage, about the anus, of the oil alone or the oil mixed with some fecal matter. In certain cases of intestinal toxemia, where the character of the feces is particularly bad and accompanied by considerable gas, there will be seepage of a mixture of fecal matter and mucus, which causes a moist, foul-smelling lesion around the anus and the area below it. Lesions about the anus are not infrequently found resulting from ordinary cases of constipation or prolonged diarrhea. Involuntary movements are seen in prolonged attacks of diarrhea, paresis of the cord and when the animal is near death.

There are various methods of producing elimination, each of which is best suited for a specific purpose. In the early stages of any febrile disease, especially those affecting the respiratory system, the most satisfactory way to begin treatment is by using a full dose of castor oil. It is sometimes possible thereby to abort the condition and always possible to remove a considerable amount of infection, and at least limit the severity of the disease. In cases of diarrhea which have not been in evidence for too long a period castor oil should likewise be given.

Some people dislike the taste of castor oil and are loath to give it to their dogs. Consequently most druggists and some veterinarians have gotten into the habit of giving syrup of buckthorn either alone or with the castor oil in order to get away from the disagreeable taste of the oil. However, dogs, as a rule, do not object to castor oil to any greater extent than they do toward taking any other dose, and since buckthorn is a drastic cathartic, and produces its action through irritation of the intestinal walls, its use in any condition where there is already present a degree of inflammation, however,

slight, is but adding fuel to the fire and increasing rather than lessening the inflammation. The same may be said of such other drastic cathartics such as aloes, jalap, etc.

In those cases where the fecal discharge is hard and passed with difficulty, or when the presence of bone and other foreign materials is known to exist either by knowledge of what the dog has consumed, or by rectal examination, the use of mineral oil is indicated. It should be given in repeated doses until a considerable quantity has been consumed. It may then, if necessity requires it, be followed by a dose of castor oil. When there is a tendency to vomit, oil, especially castor oil, should not be administered, since there is little chance of its being retained, and its administration will consequently only aggravate the condition. In such cases milk of magnesia should be used, and when combined or alternated with minute doses of mineral oil may suffice if the fecal boluses are not too voluminous or too hard.

When bile is present in the feces, or the vomitus, or where there is evidence of an affection of the liver or kidneys, a saline should be the laxative of choice. Epsom salts are the most drastic and thorough, but they are difficult to give and are not well tolerated if there is any tendency toward vomiting. The best way to administer salts is in capsule, but since the proper dose is large it is necessary to use so many capsules of the size which a dog can swallow that the difficulty of administration is greater than when given as a liquid. When the salts are dissolved in moderately warm water, to which has been added sugar or a syrup they are not so difficult to give.

The laxative sodium salts, such as sodium sulphate, or phosphate, are tolerated well and produce quite satisfactory action. Milk of magnesia is by far the most convenient saline from point of administration. Its action is not violent, it is well retained and easy to give. Its action may be increased by following the dose with orange juice. Personally I do not like calomel. It is not well tolerated, its action is inconsistent and it must be followed with a saline purge. In addition, in many of the cases in which it is seemingly indicated the cause of the disturbance is a metallic poison.

Of all the methods of emptying the bowel the high irrigation is by far the most satisfactory. Whether the trouble is constipation, autointoxication or diarrhea, the thorough flushing of the bowel cleanses and soothes the irritated membranes and stimulates normal action.

When there is a hard mass to move, enemas of soap or oil, or both, are first given, and then followed with high irrigations of sodium bicarbonate solution. When peristalsis is poor, salt may be used to an advantage. Irrigations are generally thought by the laity to be weakening to the animal, but, on the contrary, are very often stimulating and may be used daily over a period of two weeks with no unfavorable results. Since we have to depend on the word of the owner for the condition of the animal's bowels, it is very easy to become misled either because of oversight or through the lack of observation on his part. An irrigation can never do any harm, and it may be used frequently with advantage to determine the exact condition of the intestinal tract. It is, of course, a messy job and one which we would like to side-step, but many times when I have allowed myself to do so I have later regretted it.

GOITER IN A POINTER

Last winter a beautiful young pointer, about fifteen months old, was entered in an indoor field trial and made a wonderful showing the first night, but a very bad showing the second night on account of being highly nervous. The following day he was brought into the hospital and placed under observation. His condition was evidently caused by goitre. He was placed on a treatment of dessicated adrenal cortex, one 2-gr. capsule being given three times daily.

He made a rapid recovery and was discharged at the end of two weeks and has remained normal since with an occasional two-day treatment of adrenal cortex.

Since then four cases of goitre have been treated in this way and all of them made very rapid recovery.

Albert E. Merry.

Syracuse, N. Y.

Ailments of Hunting Dogs

By I. M. HAYS, Auburn, Alabama

THE degree of susceptibility to disease in all breeds of dogs is relatively the same. Hunting dogs, both hounds and bird dogs, have generally a rugged constitution and withstand disease very well. In former times when hunting dogs were less valuable, disease among them was comparatively rare, because they had free range and few restrictions. At the present time the dog industry has progressed so rapidly that the methods of handling have necessarily been radically changed. Bird dogs and hounds are intensively bred and systematically trained; they are collected together in large contralized kennels and cared for in groups. This rapid change in the living conditions of the dog has, of course, brought about disease.

Split Ear in Hunting Dogs

Split ears are usually the result of accidental injury and if not properly handled rapidly become chronic. The margin may be wounded and the cartilage separated in several places. The wounded areas soon become crusted over with wound secretion but fail to heal. Such animals are found to shake their heads vigorously, whipping the long ears about and thus creating an excessive blood pressure in the ends of the ears that retards or prevents healing.

The ear canal always should be examined for the source of irritation. In many cases if the canal is filled with etherized iodoform the irritation is relieved. The split margins which refuse to heal may be treated in either of two ways. They may be cauterized with silver nitrate or phenol; or the ragged margins may be trimmed, after which a cotton and collodion bandage should be applied and the ears bound securely to the head with adhesive tape. This procedure alters the appearance of the dog somewhat but it makes little difference since the hunting dog is usually kept for service rather than for show purposes.

Hookworm Infestation

One of the chief sources of disease in kennels is an infestation of parasites of the intestinal tract, most varieties of which are easily recognized.

One condition rather commonly encountered may be called, "chronic hook worm infestation." It is not easily recognized and is often entirely overlooked. In such a case the parasites are never numerous and produce few of the symptoms commonly associated with hook worm infestation. There is no anemia, but rather, the visible mucous membranes are often slightly congested. The animal is unthrifty, slightly emaciated, usually he shows a preference for certain foods and drinks large amounts of water. The hair coat is rough and the appetite is materially affected. In most cases the animal is decidedly constipated the feces being hard and having a burned appearance and being more or less covered with mucus. There is a great tendency to stretch and yawn frequently, and there is always a very disagreeable halitosis. The entire clinical picture is one of simple chronic indigestion. Many specimens of feces may be examined microscopically before any ova are found. In less chronic cases where parasites are present in greater numbers the dogs are usually more active and in that case there is a diarrhea which is usually characterized by blood-streaked feces especially if mucus is present.

In the true chronic cases the parasites are so few in number and remain active enough only to produce local irritation to the intestinal mucosa, the general symptoms being due to the absorption of toxic substances from the deranged intestinal tract. The parasites appear to remain attached to the mucosa and are always well covered with a heavy coating of mucus, thus, they continue as a source of irritation and they are so well protected

that no anthelmintic can reach them. Very frequently these cases will have a history of having been given the proper anthelmintic treatment with no benefit whatever.

In treating the disease the object is to remove the secretions from the intestinal mucosa, this is done by producing a gradual, active catharsis. Administer one ounce of castor oil or magnesium sulphate each day for two doses, then follow with one-half to one grain of arecoline hydrobromide. The feces will soon become liquid and tinged with blood which indicates that the intestinal mucosa is denuded and free of exudate. At this stage fresh tetrachlorethylene in flexible gelatin ovals should be given in dosage of 1cc for each ten pounds of body weight. No cathartic need follow. On the following day it is well to administer an intestinal antiseptic to heal the wounded mucosa and check the catharsis and for this purpose the following mixture gives good results.

Bismuth subnitrate.....1 ounce
Tannic acid .....5 grains
Tinct. Camphorated Opium..1 dram

This may all be given at one dose in a No. 10 gelatin capsule, and repeated on the second day if necessary.

Chronic hookworm infestation is seen occasionally in all kennels but it most commonly occurs where the kennel yards are on sandy soil. Removing the top soil and replacing it with a hard packing clay helps materially in eradicating the worms.

Isospore Infestation

This is a disease of the small intestines caused by a very small spore which closely resembles coccidia. It may be seen only with very high magnification. It occurs only in isolated cases and seldom becomes a serious kennel disease, it is often associated with other intestinal parasites and especially with chronic hookworm infestation. The disease is usually chronic but if the spores are present in sufficient numbers it becomes subacute.

The symptoms produced are more or less vague; the animal becomes emaciated and dehydrated; there is an increasing thirst, the reflexes of the skin become deranged; there is a sticky yellow pus around the margins of the eyelids, and the conjunctiva has an injected appearance; the gums are hyperemic around the margins and the teeth are often covered with a brown film which may be removed

Laparo-Metro-oophorectomy—Horning

readily. A diarrhea is present and the feces are usually tinged with blood. The parasites produce a thickening of the intestinal wall which interferes with selective absorption, and if they are present in large numbers the animal soon becomes quite toxic.

The treatment consists of beta-naphthol and quinine sulphate, five grains of each given on alternate days until four or five doses of each drug have been given; then follow with two grains of calomel. After this treatment it is well to put the animal on a tonic mixture for a week or two.

Ear Canker in the Dog

Canker of the ear may be caused by infection, parasites and foreign bodies. It is quite important to determine the etiology before beginning treatment. Cankered ear, when caused by infection, produces rather large quantities of a thin yellowish brown pus which has an offensive odor and usually flows down the side of the face. The process often extends well down the auditory canal and also covers much of the under surface of the outer ear. The mucous membrane and skin are hyperemic and if the infection is of long standing will be thickened.

In treating the infective type it is well to clean the ear thoroughly once each day with saturated ether swabs and to fill the canal entirely either with etherized iodine or etherized iodoform, depending on how tender the ear is. The delicate ears respond best to the iodoform. This treatment may be kept up for a week or even for a longer period of time. Occasionally the infection is very soon killed, and if the treatment is continued, in such a case, the treatment itself becomes an irritant and the secretion appears to increase. The treatment should be suspended under such conditions and some emollient preparation applied.

If the irritation is caused by mange mites, there will seldom be so much secretion, except in the lower portion of the canal; the outersurface will be thick, dry, scaly and have a slate-colored, wrinkled appearance. In treating this type of canker the ear should be cleaned with ether swabs and dressed with a mixture of balsam of Peru and alcohol (alcohol 7 parts: balsam of Peru 1 part).

Float of Drs. Schmidt and Ruggles in the Merrykana Parade (Portland Rose Festival) June, 1929

PUS IN THE ANTRUM

The patient was a seven-year-old fox terrier. There was a sinus opening about a quarter of an inch in diameter, situated just below the center of the left eye socket, from which pus had been discharging for three or four weeks. The opening had been cauterized to aid healing, but this had merely aggravated the condition.

By passing a fine probe into the opening, we found that the canal passed through the bone of the face down to the vicinity of the roots of the fourth upper premolar. This tooth was not loose, nor did it appear discolored more than the adjoining teeth, but the gums around it bled easily. This tooth was diagnosed as the cause of the trouble.

The dog was anesthetized with ¾ grain of morphine injected locally in the gums around the tooth. The gum was cut away from the tooth and the tooth loosened with an elevator. The tooth split and was extracted in two pieces with forceps. There was a black line of necrosis in the center of the pulp cavity. Excellent drainage was established and the tract washed daily with a boric acid solution both from the opening below the eye into the mouth, and from the opening in the gum through the opening below the eye. Nine days after the tooth was extracted the canal had almost entirely healed.

Discussion

The common name for this condition—pus in the antrum—is erroneous, since there is actually no hollow cavity involved. The canal in all these conditions is *within* the facial bones, and does not enter any of the facial sinuses.

Experience has shown that a discharge of pus through the bones of the face is almost always caused by a decayed tooth, and this tooth is usually the fourth premolar. This is especially true when the opening is under the eye, because the roots of the fourth premolar extend upward to within a very short distance of the eye socket. Necrosis from the decayed tooth follows the root canal upward and causes necrosis of the bone, muscles, and skin at the end of the root canal just under the eye socket, which allows the pus to escape at this point.

Even when the fourth premolar appears sound and another tooth is definitely diseased, the extraction of the diseased tooth usually has no effect upon the dealing of the opening in the face. It is always necessary to extract the fourth premolar and get drainage into the mouth before healing occurs.

D. B. Crane.

Ithaca, N. Y

CANCER OF TESTICLE IN A DOG

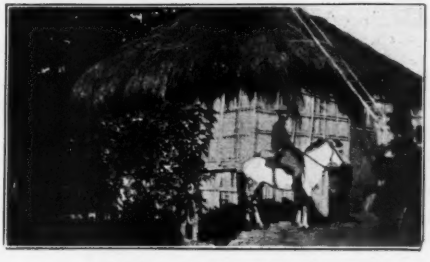
About the middle of June, 1931, a white Spitz dog, seven years old, was brought in for examination. He showed a growth of half the size of a grapefruit in the scrotal region. It proved to be a diseased right testicle. This dog was held for the clinic of the New York State Veterinary meeting on June 25th. At that time he was given a dose of morphine and was operated upon by Doctor Stephenson of the New York State Veterinary College.

The testicle and cord were found to be cancerous and an unfavorable prognosis was given the owner, because metastic tumors could be palpated in the cord and were thought to exist anterior to the point where it was possible to ligate the cord. The wound was treated with a metaphen solution, kept covered and made a splendid recovery.

At the end of about six weeks he was again brought in with a large swelling in the left flank, which proved to be an abscess and continued to discharge in spite of treatment. At the end of ten days he was destroyed and upon autopsy it was found that all of the abdominal organs were involved in the malignant growth.

Albert E. Merry.

Syracuse, N. Y.



Equitation in the Philippines

ANTHRAX IN OVERFLOWED LANDS*

Anthrax has occurred in the Delta region of Arkansas on certain farms and premises for a period of 70 years. The infection in the Delta and overflowed section of the Mississippi and Arkansas Valleys is probably traceable to the carcasses of animals that died of anthrax while being transported by steamboats and were discharged into river water.

A favorable season for anthrax is one of ample moisture during the spring, followed by a dry spell and hot weather. How anthrax spores retain their virulence in the soil for an indefinite period of years has not been ascertained. Apparently the permanently infected anthrax areas in Arkansas are not increasing in extent. The reason for this lies probably in the different character of the non-infected soil.

Flies are an important factor in transmitting anthrax from animal to animal in infected herds. The diagnosis of anthrax, particularly in areas where it is not known to have occurred previously, depends largely upon animal inoculation. It is advisable and in the State of Arkansas, compulsory for all dead animals other than those slaughtered for food, to be burned. By this procedure, the spread of anthrax is probably often prevented. The use of preventive inoculation in known anthrax areas during the spring months has proved of value.

Rich alluvial soils containing lime are most favorable for the perpetuation and virulence of anthrax spores. Man contracts anthrax but rarely, then usually from skinning carcasses. The bacilli are not found in the blood stream until death approaches, never more than 18 hours previously. The use of large doses of anti-anthrax serum alone and repeated in 18 days or in conjunction with spore vaccine is a valuable control measure after outbreaks occur. Incision of anthrax carcasses transforms easily destroyed bacilli to more hardy spores.

*From a discussion by J. H. Bux, Little Rock, Arkansas, at the 44th annual meeting of the Iowa Veterinary Medical Association, Des Moines, January 12-14, 1932.

NOTES ON SHEEP DISEASES

In view of the increased interest in diseases of sheep in this country, the following observations* of our Australian colleagues may be of interest:

Infectious Pneumonia

The symptoms of infectious pneumonia are, the sudden onset of the disease, marked rise in temperature, dyspnea and rapid death.

Post mortem findings showed the lesions of pneumonia and pleurisy.

From the pneumonic portions of the lungs, an organism agreeing in morphology and cultural characteristics with the bacillus Friedländer was cultured. The disease was reproduced in guinea-pigs, rabbits and sheep by intrathoracic and intravenous injection of cultures of the organism. From the lesions that ensued, the bacillus was recovered again.

Infectious Ophthalmia

Infectious ophthalmia in sheep is widespread in New South Wales. It is most common in summer, though seen at different seasons of the year.

The symptoms are an acute conjunctivitis followed by keratitis in 4 to 5 days. The blindness may persist for 10 or 11 days after which either resolution may occur, or suppurative keratitis ensue persisting for several weeks, with remissions at intervals, or clearing up within a week or two.

The condition could be produced experimentally by the instillation of one drop of the lacrimal secretion from an affected sheep into the eye of a healthy sheep. Attempts to isolate and demonstrate the etiological factor responsible for the disease were not attended with any success.

The disease is specific for merino-sheep and crossbred animals only. Other species of animals are not susceptible. The disease was found to be infective in all stages from the earliest appearance of symptoms. A

*Veterinary Research Report No. 6, Parts I and II, by H. R. Seddon, D.V.Sc., Director of Veterinary Research, New South Wales Department of Agriculture.

strong immunity is established in the recovered sheep but it is purely local. A sheep recovered from ophthalmia in one eye is readily susceptible to infection of the other eye.

As the result of tests undertaken with various medicaments, the treatment of affected eyes with 2.5% zinc sulphate solution is recommended.

Lungworms of Sheep

Concerning treatment of young sheep for lungworms, *Dictyocaulus filaria,* infestation, the following mixture, injected intratracheally gave the most satisfactory results: Ol. terebinth. 1cc, Creosote 0.5cc, Ol. oliv. 2cc, Chloroform 0.5cc. In doses of one-half the foregoing formula this mixture apparently killed all lungworms, for none were found on postmortem examination. Full doses given on three occasions within six days did not cause serious pulmonary lesions in either of two sheep treated.

Intratracheal injections of tetrachlorethylene, 1cc in 2cc of olive oil destroyed the parasites but pneumonic lesions were marked.

Stomach and Intestinal Worms

Conditions requisite for the transmission of gastro-intestinal nematodes of the sheep are quite favorable under continued grazing on infested grass land, but this is not necessary for infestation with *Haemonchus, Ostertagia* and *Nematodirus,* which may result to some slight extent when placing sheep in contact with infested sheep on bare ground.

While low lying ground is most favorable, a heavy infestation with *Haemonchus, Ostertagia* and *Nematodirus* may be contracted from sloping grass land pasture continually grazed.

There is evidence that *Oesophagostomum* is stricter in its requirements than the other nematodes mentioned.

Fritz Volkmar.

Columbus, O.

TUBERCLE BACILLI

SWINE BRUCELLOSIS*

Swine Brucellosis is more or less prevalent in the middle west. Losses from the disease vary from year to year, there being more abortions in some years than in others. There is little evidence to show that there is a direct relationship between the occurrence of swine abortion and cattle abortion on the same farms. From available information it seems that Swine Brucellosis is of greater importance from the public health standpoint than is Bang's disease of cattle.

The usual losses from swine abortion occur from January to March. Abortions occur quite rapidly in an affected herd. For instance, in a herd of twenty sows 16 or 18 may abort within two or three days. Aborting sows usually show a distinct illness shown by elevation of temperature, depression, and joint pains evidenced by the animals not wanting to move. In this particular, brucellosis is quite different from Bang's disease in cattle and quite similar, symtomatically, to undulant fever in the human.

In a considerable number of cases of polyarthritis studied by the author, *Brucella abortus suis* has been identified. Sub-acute or chronic brucellosis characterized by polyarthritis is apparently as common in barrows as in breeding animals.

The malady in swine may be controlled quite successfully by the use of biologics, bacterins having produced good results. Many practitioners have reported good results from the use of the ordinary avirulent bovine abortion vaccine in treating swine.

*From a discussion by Ashe Lockhart, Kansas City, Mo., at the 44th annual meeting of the Iowa Veterinary Medical Association, Des Moines, January 12-14, 1932.

Book Reviews

Veterinary Obstetrics. By W. L. Williams, Professor Emeritus, formerly Professor of Obstetrics and Research Professor in the Diseases of Breeding Cattle in the New York State Veterinary College at Cornell University. Second Edition, thoroughly revised. Published by the Author. Price $6.50.

To review the most recent edition of this widely known work, and do it justice, would almost require a mentality competent to do likewise with an encyclopedia. It is the product of a combined experience, thought and judgment rarely found in veterinary literature. The author's experience as a practitioner, professor, research worker and consultant has been wide, rich and unique. His manner of thought is direct and skilful: his judgment sound. What more need be said of any volume save that it is up-to-date, well bound and profusely illustrated?

A keen appreciation of the practitioner's viewpoint is stated thus. *"When a young veterinarian is confronted with a severe case of dystocia, he faces one of the most perilous and trying situations in his professional career. . . . He has little opportunity to consult with a colleague but must proceed at once to victory or defeat."* This is continued by the author's frank disapproval of sharp obstetric hooks, his comment on the virtues of the Benesch foetotome, his remarks on epidural anesthesia and on, through many topics, to the handling of scours in calves and the treatment of milk fever by new as well as time tried methods.

The student will find the subject logically developed from its bases in anatomy and embryology. A knowledge of special pathology is somewhat assumed but this is available in the companion volume "Diseases of the Genital Organs of Domestic Animals," published by the same author some years ago. There is an ample and modern bibliography: few references are included which antedate the preceding edition.

Despite its eminence as a treatise on the subject, the main economic value of this work may prove to be other than obstetric in the limited sense of that word. If abortion, sterility and dystocia are the main failures of reproduction, and if obstetrics is concerned chiefly with the last, at best, it can overcome only the least of these, without touching the common cause of all. *"The present treatise is based upon the belief that the pathological phenomena of veterinary obstetrics are as natural as those of physiological birth, are authentically predictable, and subject, in an important degree, to control."* Thus without so stating (the author has done so elsewhere) the book implies a code of morality for breeders. For this reason it should have a wider appeal than to the veterinary profession alone.

Finally, Doctor Williams admits in his preface that *"The conclusions reached will naturally not be universally endorsed"* and adds humorously, *"That is not vital."* But is this humor or deep understanding? From the evidence submitted, it seems that attempts to shake the belief will only support it the more.

Alfred Savage, D.V.M., M.R.C.V.S.

Pathologische Histologie der Haustiere. (Histopathology of domestic animals) by Dr. L. Lund. Hanover, Germany, 1931, M. & H. Schaper. Pp. 471; fig. 311.

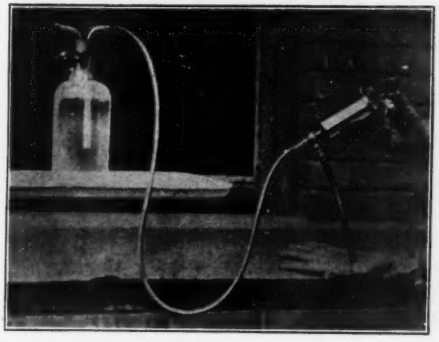
The student of Veterinary histopathology has been handicapped in the past by the lack of a proper guide or reference work to the microscopical anatomy of pathological conditions. The textbooks in use in medical schools are unsatisfactory for the reason that a number of diseases and pathological processes of specific interest to the veterinarian are not discussed. It is true, the minute morbid anatomy of domestic animals is, to a certain extent, considered in the contemporary textbooks of veterinary pathology, notably in the works of Kitt and of Joest. Nevertheless the author is to be congratulated on having undertaken the commendable task of assembling the scattered material and of writing a textbook on the difficult subject of histopathology. The excellent qualifications of the writer, who is the author of practical treatises on pathology and on food hygiene

and a successful teacher at the Veterinary College at Hannover, Germany, can not be contested. It is to be hoped that a translation of this valuable work will be made so that its content will be available to students in this field, not acquainted with the German language.

The book is divided into a general and a special part. The general part forms an introduction to the subject and gives a concise summary of the appropriate histopathologic methods. The special part is conveniently subdivided into eleven sections, dealing with the blood and blood-forming organs, circulatory organs, respiratory organs, digestive organs, urinary organs, sexual organs, locomotory apparatus, skin, central nervous system, endocrine glands and tumors. A bibliographical index referring exclusively to German literature is appended. The well arranged subject index facilitates the use of the book. The text is profusely illustrated with good microphotographs. In view of the recently awakened interest in the so-called "anemia of suckling pigs" in this country, a disease known in Europe for decades and described in the literature under the name of "enzootic hepatitis of young pigs," I may be allowed to quote from the respective paragraph in the book in order to indicate the style of the author and his treatment given to the subjects:

"A disease of the liver, due to various causes, exhibiting lesions similar to those of toxic dystrophia of the liver, has frequently been observed in young pigs up to the age of six months in an enzootic form. This disease is also known under the name of hepatitis enzootica porcellorum. It takes the course of an hemorrhagic-necrotic inflammation. Microscopically the process starts with a parenchymatous clouding and fatty degeneration of the liver cells. The cell nuclei exhibit pycnotic and karyolitic changes which may be clearly demonstrated in the individual cells. The liver cells shrink but keep their appearance. The boundaries in the central section of the lobules become hazy. Often detritus is seen here consisting of protein rests and fat droplets. Toward the periphery the changes in the cell disappear. Not infrequently gall pigment is found in the centrally located liver cells and bile thrombi in the gall capillaries. The cell destruction, starting in the center of the lobule, often extends to the entire lobule. After shrinking or crumbling of the liver cells has set in, the capillaries of the portal vein, which due to the lessened blood pressure, are filled to capacity, distend and thus cause the pink appearance of the individual lobules. The stellate elements known as the cells of Kupffer contain, too, partly fat droplets and bile pigments. In the later stages, regeneratory and reparatory changes occur on the damaged liver tissue. The regeneratory changes are the result of new formation of liver cells, the reparatory changes result from the hypertrophy of the connective tissue and above all from the hypertrophy of the small bile ducts.

"The histologic picture of an advanced liver destruction in the so-called enzootic hepatitis of young pigs is shown in figure 131. Under low power and with hematoxylin-eosin stain, the extensive destruction of liver tissue may be visualized. Numerous collections of red blood corpuscules are found in place of the liver cells. Between them are situated leucocytes, lymphocytes and liver cells. The latter show various signs of degeneration, from simple cloudy swelling and fatty degeneration to complete destruction. The liver cells are still partly preserved at the border of the lobules. These are the cells from which regeneration of the liver parenchyma starts in the later stages of the disease. The individual liver lobules are



A Hypodermoclysis Outfit

sharply separated from each other by interlobular connective tissue. In this interstitial tissue may be demonstrated leucocytic and lymphocytic infiltrations similar to the ones in the liver parenchyme."

Fritz Volkmar.

SWINE ERYSIPELAS*

Until recent months it was generally believed that swine erysipelas existed in this country only in a benign form and to a very limited extent.

The organism causing swine erysipelas has probably existed in the United States for a number of years, as is indicated by the fact that laboratory workers have

Erysipelas in Swine

isolated it from the tissues of animals a number of times since 1921. The infected animals from which the organism was isolated apparently originated in widely separated sections of the country.

During recent months the disease has been diagnosed by laboratory examinations at several different points in the country. It has been observed chiefly in the septicemic form in which there are apparently three stages: the acute, subacute, and chronic. In the acute stage, the symptoms are mainly septicemic in nature, whereas in the subacute and chronic stages, many of the symptoms and lesions characteristic of the disease in European countries are noted. A definite diagnosis should not be made without laboratory examinations of specimens from infected animals.

The death losses in the untreated herds observed were estimated at 10 to 20% and as many as 10 to 20% of the animals that survived developed complications which greatly reduced their value.

The use of swine erysipelas anti-serum proved quite effective in stopping the spread of the disease among the well animals as well as a curative agent for those that had not been sick more than three or four days. In the treatment of cases of greater duration the results were less satisfactory but justified the treatment of this class of cases.

*From a discussion by Frank Breed, Lincoln, Neb., at the 44th annual meeting of the Iowa Veterinary Medical Association, Des Moines, January 12-14, 1932.

ACUTE ERYSIPELAS IN SWINE

There is a fatal disease in a herd of hogs that I have been called to see. Information relative to cause and treatment will be appreciated. These hogs were vaccinated with serum and virus several months ago; they have been given good care and weigh from 250 to 400 pounds.

The affected animals show depression and a marked diarrhea, the discharge being thin and yellow in color. Temperatures range from 104 to 104.5 deg. F. The affected animals die in from 24 to 36 hours after the onset of the disease.

Autopsy reveals a congestion of the gastric and intestinal mucosa, hemorrhagic infarcts of the spleen and numerous definitely circumscribed hemorrhages into the kidney and bladder.—L. P.

REPLY: Your letter and pig specimens received. Laboratory tests reevaled the presence of the bacillus that causes swine erysipelas, and from your description it is apparent that this malady has assumed the speticemic form in the swine in question.

When the disease is so rapidly fatal, treatment is of little value. The only treatment that would be of value is the injection of large doses of erysipelas serum intravenously. Killed cultures of the erysipelas organism injected intravenously has given good results in less acute attacks, according to some practitioners. Either the serum or bacterin is of value as a preventive agent.—A. T. K.